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ABSTRACT

Selected titles among the 51 papers accepted for presentation or publication by the 1990 meeting of a yearly forum for agricultural research presentation include the following: "Effectiveness of Beginning Scholars Program in Attracting High Ability Students to the College of Agriculture and Home Economics" (Lester, Graham); "Analysis of Enrollment in Secondary Agricultural Science and Membership in FFA in Texas" (Marshall et al.); "Factors Influencing Secondary Michigan Agricultural Students' Decisions Not to Join FFA" (Connors et al.); "Career Indecision of Senior Agriscience Students" (Kotrlik); "Understanding and Teaching the Adult Learner" (Norland et al.); "Participant Motivation in Off-campus Agriculture Credit Programs at Iowa State University" (Miller, Crawford); "Attitudes, Knowledge, and Implementation of Agricultural Science by North Carolina Agricultural Education Teachers" (Kirby); "A Nursery/Landscape Program in Agricultural Education for the New Millennium" (Flanders, Iverson); "Herzberg's Motivator-Hygiene Theory and the Job Satisfaction of Agricultural Education Faculty" (Bowen, Radhakrishna); "Job Satisfaction of Teachers of Agriculture" (Cano); "Impact of Personal Life Factors on Effectiveness and Satisfaction of Teachers" (Bruening, Hoover); "Attitudes, Perceptions, and Guidance Practices of Illinois Guidance Directors Concerning Vocational Education in Secondary Schools" (Matulis, Osborne); "Teacher Attributes in Exemplary Vocational Education" (Wardlow et al.); "Transactional Preferences of Students and Teachers during Group Problem Solving" (Dormody); "Teachers' Knowledge and Attitudes toward Problem-Solving Teaching" (Hamzah, Osborne); "Factors Influencing Use of Volunteers by Michigan Secondary Agricultural Education Teachers" (Elliot, Suvedi); "Subject Areas and Concepts of Agricultural Literacy" (Frick et al.); "Assistance Needed by Elementary Teachers in Texas to Implement Programs of Agricultural Literacy" (Terry et al.); "Factors Related to Participation of Agricultural Educational Teachers in Professional Development Activities" (Hall, Scanlon); "Use of Computer Software Programs in Specific Agriculture Topics" (Zidon, Miller); "Student Cognitive Performance and Factors Associated with Cognitive Performance in College of Agriculture Courses" (Miller, Newcomb); "Relationship between Vocational Agriculture and College Preparatory Curriculum in Regards to Academic Success in College" (Raven, Warmbrod); "Student Perceptions of Characteristics and Activities Contributing to Effectiveness of Vocational Agriculture Teachers" (Luft, Thompson); "Beginning Vocational Education Teacher Perceptions of Their Pedagogical Knowledge and Performance on the Professional Knowledge Portion of the National Teacher Exam" (Doerfert, Barrick); "A Study of the Relationship of Participation in In-School 4-H and Self-Esteem for Students in the Las Vegas School System" (Waters et al.); and "Focusing Agricultural Education Research: Strategies for the Professor" (Williams). (YLB)

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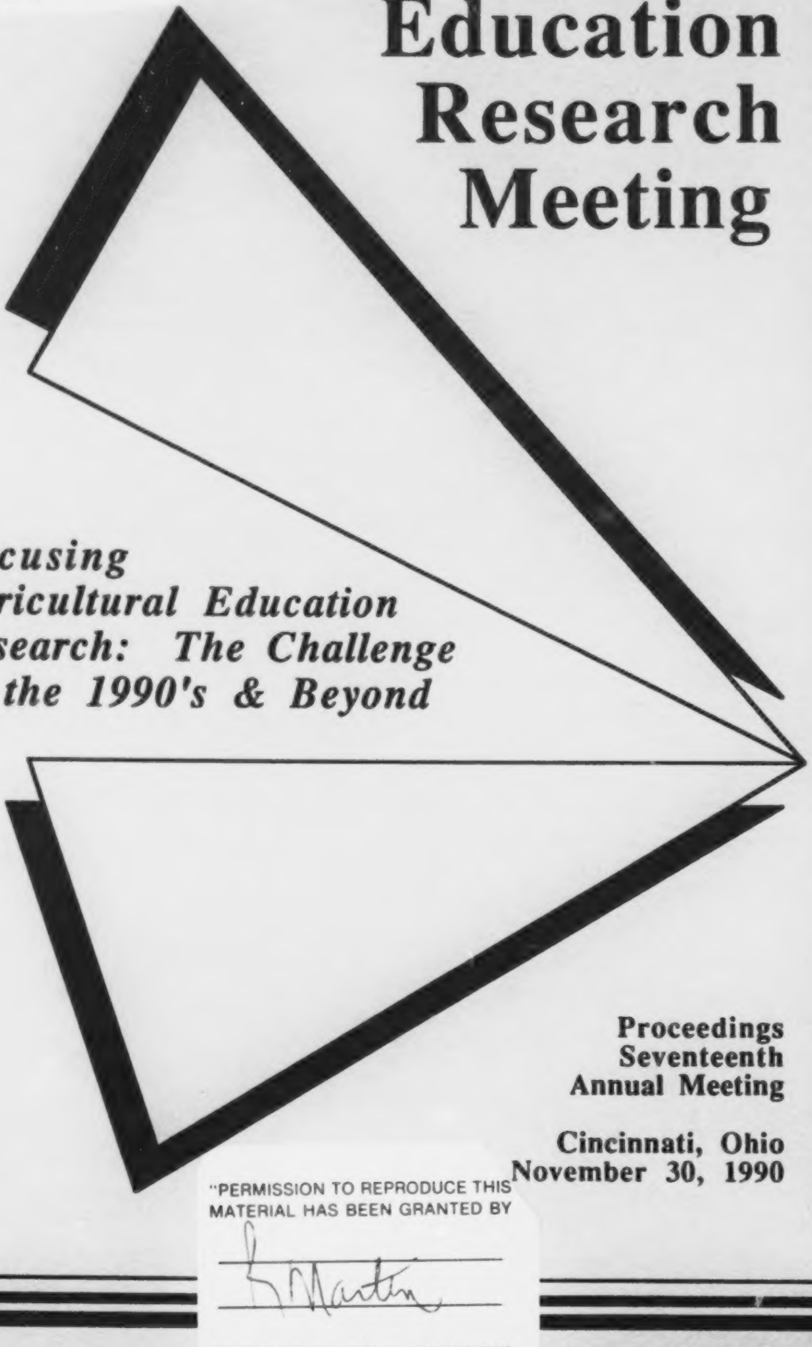
National Agricultural Education Research Meeting



Focusing Agricultural Education Research: The Challenge of the 1990's & Beyond

**Proceedings
Seventeenth
Annual Meeting**

**Cincinnati, Ohio
November 30, 1990**

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Focusing Agricultural Education Research:

The Challenge of the 1990's and Beyond

Volume XVII

The Proceedings of The National
Agricultural Education Research Meeting

Compiled and Edited by

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The Seventeenth Annual
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Ames, Iowa

November 30, 1990
Cincinnati, Ohio

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Preface

The National Agricultural Education Research Meeting (NAERM) is a forum focusing on research in the field of Agricultural Education. The NAERM is held annually in conjunction with the American Vocational Association Convention. Since its first meeting in 1974, the number of paper submissions, research presentations, and attendees has grown both in quantity and quality.

This year's program has involved individuals from a large number of states across the United States and several individuals from other countries. There were 90 presenters involved in the 1990 program. An additional 35 participants assisted in the program as chairpersons, facilitators and discussants. A total of 111 papers were submitted for consideration for presentation at this seventeenth meeting. Each paper was reviewed and evaluated by four members of the profession. Using the ratings assigned by these reviewers, the top 44 papers were accepted for presentation at the conference. This information represents a 39.6% acceptance rate. In addition, another seven papers were accepted for publication in the proceedings as alternate papers. When these additional papers were included, the acceptance rate was 45.9%.

This year's program represents an increase by 8 papers over the number of papers presented in the past. In addition, all paper proposal titles and authors are listed in the proceedings. Seven criteria were established a priori for use in making decisions regarding acceptance of papers for NAERM. These criterion included: 1) Had to follow paper specifications, 2) Had to be among the highest rated papers as ranked by evaluators, 3) Had to have at least 185 points out of a possible score of 308 points, 4) Had to have two ratings of either a 4 or 5 or combination of 4 and 5, 5) Had to have 3.00 or higher average rating, 6) Could not have two rejection ratings of 1 or 2, 7) Comments given should support paper's presentation.

The purpose of the NAERM are presented here to remind us of our focus*.

1. To present and disseminate the most recent and best research on the national levels as judged by referees.
2. To present and disseminate critiques of the research by researchers in the profession.
3. To provide a forum for discussion of research in agricultural education.
4. To provide feedback to authors regarding research procedures and methodology used.
5. To provide suggestions to authors for preparing manuscripts for publications.
6. To give novice researchers an overview of current research issues, methodology, and critique within the profession.
7. To improve the quality of research conducted in future years.
8. To identify and recognize the Outstanding Paper Presentation at the National Agricultural Education Research Meeting on an annual basis.
9. To provide a written record of quality research completed and professional critique over time.

10. To broaden horizons and chart new directions for the conduct of agricultural education research in the future.

*Outlined and presented by Al Mannebach in the Preface to the 1987 NAERM Proceedings.

The standard of excellence for the 1990 NAERM was established by those who chaired previous meetings. The 1990 NAERM is the seventeenth meeting in a series of distinguished meetings. Previous meetings and their respective chairpersons are listed below:

Previous Meetings and Chairpersons

1. 1974 - New Orleans, LA - Hollie Thomas, Florida State University
2. 1975 - Anaheim, CA - Hollie Thomas, Florida State University
3. 1976 - Houston, TX - Glen Shinn, Mississippi State University
4. 1977 - Atlantic City, NJ - William Richardson, Purdue University
5. 1978 - Dallas, TX - Bennie Byler, Mississippi State University
6. 1979 - Anaheim, CA - Ronald Brown, Mississippi State University
7. 1980 - New Orleans, LA - L. H. Newcomb, The Ohio State University
8. 1981 - Atlanta, GA - Maynard Iverson, North Carolina State University
9. 1982 - St. Louis, MO - Dale Oliver, Virginia Tech State University
10. 1983 - Anaheim, CA - Paul R. Vaughn, New Mexico State University
11. 1984 - New Orleans, LA - Jimmy G. Cheek, University of Florida
12. 1985 - Atlanta, GA - Bob Stewart, University of Missouri
13. 1986 - Dallas, TX - Alan A. Kahler, Iowa State University
14. 1987 - Las Vegas, NV - Alfred J. Mannebach, University of Connecticut
15. 1988 - St. Louis, MO - Edgar P. Yoder, The Pennsylvania State University
16. 1989 - Orlando, FL - Michael F. Burnett, Louisiana State University

I hope that the proceedings of the 1990 NAERM will be useful to everyone in the agricultural education family as well as other professionals interested in research in agricultural education. I also hope that all presenters will submit their work for possible publication in a professional journal. It is time to begin preparing for the 1991 NAERM. Please submit paper proposals for consideration to Larry Arrington, University of Florida. Any comments you may have about this year's procedures or suggestions for improvement of future meetings will be appreciated.

Robert A. Martin, Chairperson
1990 National Agricultural Education Research Meeting

Acknowledgements

It has been an honor and a privilege to have the opportunity to serve Agricultural Education as the Chairperson of The National Agricultural Education Research Meeting. However, the successful completion of this task could not have been possible without the dedicated service and assistance of a large number of people to whom I am sincerely grateful. An undertaking of this magnitude required the involvement, cooperation, and assistance of many people. I want to acknowledge and show my appreciation to a number of individuals who helped make this meeting successful: to Mike Burnett, 1989 NAERM Chairperson, who provided guidance and assistance whenever called upon; to Joe Harper, Chairperson, Research Committee, Agricultural Education Division, American Vocational Association and to Research Committee Members for sponsoring and assisting in conducting the meeting; to John Davis, Program Chairperson, Agricultural Education Division, American Vocational Association, who made many arrangements and coordinated the overall program planning effort; to David L. Williams, Professor and Head, Department of Agricultural Education and Studies, Iowa State University, for providing the needed administrative support for the successful completion of this program and agreeing to prepare and deliver the keynote address at the conclusion of the conference; to Mr. Ken Glaser, Mr. Larry Geerts and Mr. Nick Mangan, Iowa State University for providing technical assistance; to all participants in the program - reviewers, chairpersons, facilitators, discussants, presenters, outstanding paper evaluators, and registration workers - whose efforts resulted in an excellent conference; and to all members of the profession who submitted research paper proposals and permitted their work to be judged by their peers. In addition, a very special acknowledgement is due to Ms. Barbara Olson, Secretary, Department of Agricultural Education and Studies, Iowa State University, without whose diligent and untiring efforts, the preparations for this conference could not possibly have been completed in a timely fashion in such an excellent manner.

A special "thank you" is due to the following Agricultural Education professionals who served as reviewers and whose work provided the basis for the objective selection of papers to be presented.

Reviewers

* Larry Arrington, University of Florida
* R. Kirby Barrick, The Ohio State University
* Lloyd Blanton, Clemson University
* Blannie Bowen, The Pennsylvania State University
* Michael Burnett, Louisiana State University
* Susan Camp, State University of New York - Oswego
* James Christiansen, Texas A&M University
* John Crunkilton, Virginia Tech.
* Samuel Curtis, The Pennsylvania State University
* Julia Gamon, Iowa State University
* Stacy Gartin, West Virginia University
* Steve Harbstreit, Kansas State University
* Ray Herren, University of Georgia
* David Howell, University of New Hampshire
* Alan Kahler, Iowa State University
* James Key, Oklahoma State University
* Barbara Malpiedi Kirby, North Carolina State University
* Joe Kotrlik, Louisiana State University
* David Lawver, Texas Tech.

- Richard Linhardt, University of Missouri
- N. L. McCaslin, The Ohio State University
- Jeff Moss, University of Illinois
- Edward Osborne, University of Illinois
- Jerry Peters, Purdue University
- Leon Schumacher, University of Missouri
- Glenn Shinn, Clemson University
- Regina Smick-Attisano, Virginia Tech.
- Gary Straquadine, Utah State University
- Robert Terry, Oklahoma State University
- William Thuemmel, University of Massachusetts
- George Wardlow, University of Minnesota
- Randol Waters, University of Tennessee
- David L. Williams, Iowa State University

In addition, the following members of the profession gave their time, efforts and expertise in the conduct of the meeting. Their efforts were sincerely appreciated.

Discussants

- Joe Gliem, The Ohio State University
- Ray Herren, University of Georgia
- Jeff Moss, University of Illinois
- Jerry Peters, Purdue University
- Samuel Curtis, The Pennsylvania State University
- Lloyd Blanton, Clemson University
- Phil Buriak, University of Illinois
- Stacy Gartin, West Virginia University
- Paul Vaughn, Texas Tech University
- Glenn Shinn, Clemson University
- Michael Burnett, Louisiana State University

Chairpersons

- Connie Baggett, The Pennsylvania State University
- John Creswell, Iowa State University
- J. Dale Oliver, Virginia Tech.
- David Howell, University of New Hampshire
- Susan Camp, State University of New York-Oswego
- James Key, Oklahoma State University
- David Lawver, Texas Tech. University
- H. Robert Terry, Oklahoma State University
- Regina Smick-Attisano, Virginia Tech.
- Leon Schumacker, University of Missouri
- Jackie Deeds, Mississippi State University

Facilitators

- John Creswell, Iowa State University
- Gary Maricle, University of Missouri
- Richard Clark, The Ohio State University
- John D. Harrison, University of Missouri

- * Matt Baker, California State Polytechnic
- * Rosemarie Rossetti, The Ohio State University
- * Steve Harbstriet, Kansas State University
- * Richard Linhardt, University of Missouri
- * Jackie Deeds, Mississippi State University
- * N. L. McCaslin, The Ohio State University
- * Bob Birkenholz, University of Missouri
- * Michael Newman, Mississippi State University
- * Mike Swan, North Dakota State University
- * Barbara Pies, Iowa State University
- * Larry Arrington, University of Florida
- * Jan Henderson, The Ohio State University

Registration Personnel

- * John Creswell, Iowa State University
- * Larry Arrington, University of Florida

Outstanding Paper Presentation Evaluators

The Outstanding Research Paper Presentation Committee is a sub-committee of the Research Committee, Agricultural Education Division, American Vocational Association. The purpose of the committee is to select the Outstanding Research Paper Presentation at the annual NAERM. The chairperson of the Committee this year was Stanley Burke of Virginia Tech. Committee members were James Key, Oklahoma State University and Leon Schumacher, University of Missouri. The Committee identified evaluators to rate the presentations made at the meeting. Research paper presentations for the 1990 NAERM were evaluated by discussants and selected at-large members of the profession. Their efforts are appreciated very much.

Each of the individuals listed above contributed lots of time and effort to conduct this year's NAERM. It was through the contributions of time, energy and expertise by individuals across the profession that made the meeting a success. I extend my sincere appreciation to everyone who assisted in making this program a worthwhile and stimulating event. It was a real pleasure to serve as NAERM chairperson especially when I received so much support and assistance. Thank you.

Robert A. Martin, Chairperson
1990 National Agricultural Education
Research Meeting

THE EFFECTIVENESS OF THE BEGINNING SCHOLARS PROGRAM IN ATTRACTING HIGH ABILITY STUDENTS TO THE COLLEGE OF AGRICULTURE AND HOME ECONOMICS

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Graduate Student
Agricultural Education
University of Arkansas

Donna L. Graham
Assistant Professor
Agricultural Education
University of Arkansas

INTRODUCTION

Agriculture is America's foremost basic industry. Approximately 23 million people, one in five, work in agriculture or related fields. According to the United States Department of Agriculture's 1986 "Assessment of Employment Opportunities for College Graduates in Food and Agriculture Sciences", careers as scientists, engineers, agribusiness specialists, marketing and merchandising professionals will be in greatest demand in the 1990s.

In 1981, as an effort to reach students with academic backgrounds in science and math, the College of Agriculture and Home Economics at the University of Arkansas, initiated the Beginning Scholars program. This program provides a summer educational experience for approximately twenty students to earn college credit and learn about career opportunities in the ten departments of the College of Agriculture and Home Economics through hands-on experience, lectures and field trips. Beginning Scholars participants must have completed their junior year in high school, have an ACT score of 23 or greater, be in the upper ten percent of their class and score above the 85th percentile on the Metropolitan Achievement Test (MAT 6).

One hundred and seventy-six students have participated in the program, but the effectiveness of the program in recruiting these students to agricultural careers has never been investigated.

Several studies have focused on the factors influencing college enrollment. Fishbein and Ajzen (1975) determined that the intentions to participate in an activity could be predicted based on a person's knowledge, observations, or other information held about some issue or event. This suggests that the decision of individuals to select or not select agriculture as a field of study may be predicted by examining their beliefs about agriculture. Betts and Newcomb's study (1986) of urban students indicated that students perceived agriculture as science-oriented, however, they lacked the knowledge of its importance as an industry and as a career potential. Several investigators (Slocombe, 1985; Golladay & Wulfsberg, 1981) found family members, guidance counselors and peers to be "significant others" in a student's selection of an occupational program.

Due to declining enrollments and increased demand for graduates, colleges of agriculture are searching for effective methods of recruiting high ability students with proven academic backgrounds in the sciences. By knowing the factors that influence students to enroll in agricultural majors, administrators can establish effective programs of recruitment.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the factors that influenced college career choices of the participants in the Beginning Scholars program. The objectives of the study were to:

1. Determine demographic characteristics of the Beginning Scholar participants.
2. Determine educational choices of Beginning Scholars participants.
3. Determine if there is a relationship between demographic characteristics and career choice.
4. Identify significant factors influencing participant career choice.

PROCEDURES

The population for the study consisted of the 156 participants of the Beginning Scholars Program from 1981 through 1988. Participants from the 1989 program were not eligible to be included in the study. A list of names and a reference phone number was obtained from the University of Arkansas College of Agriculture and Home Economics Dean's Office.

A telephone questionnaire, consisting of 46 items, was developed by the researcher and validated by a panel of experts. Minor revisions were made to the questionnaire after field testing. Chronbach's alpha (.90) measured the reliability of the instrument. The questionnaire was divided into two sections. Section one consisted of eighteen questions concerning the demographic characteristics of the participants. Section two consisted of a series of 28 questions regarding seven major factors influencing educational and career decisions. These factors were: parents; other adult influences; educational and career goals; personal or career goals; recruitment techniques; and the institution itself. The Beginning Scholars program was considered a factor independent from other recruitment procedures. The participants were asked to respond to the statements using a Likert type scale ranging from zero to six. A score of zero represented no influence and six represented a strong influence. Telephone calls were made over a two week period in February of 1990. Forwarding numbers were requested if the initial phone number was no longer current for the participant or a family member. For numbers no longer in service, directory assistance was used to acquire a listing of possible surnames in immediate areas. A telephone log was kept for each potential respondent. The number of attempts ranged from one to seventeen times with an average of four calls made to each participant. Usable data were obtained from 98 of the 156 participants for a response rate of 62.8%.

ANALYSIS OF DATA

Descriptive statistics were used to describe the data relative to demographic characteristics. Correlation coefficients, Chi square tests and analysis of variance were used to determine if a relationship existed between selected factors and career choice. The alpha level of .05 was set a priori and used throughout the study.

RESULTS

The first objective was to determine demographic characteristics of the group of Beginning Scholar participants. Most of the respondents (65.3%) were reared in towns with a population of 5,000 or less or in towns between 10,000 and 50,000 (20.4%). Eighty-two percent of the participants were from rural communities and 45.9% had a farm background. Participants were asked to respond to the age at which educational or career goals were made. Over one-half (59.0%) had made an educational or career decision by the tenth grade. Table 1 shows this information according to five major categories.

Insert Table 1 here

As far as participation in agriculture related clubs, 39.8% had been members of the FFA (formerly the Future Farmers of America) compared to 34.7% of Future Homemakers of America (FHA) and 24.5% in 4-H.

The second objective was to determine the educational choices of Beginning Scholars participants. Almost all of these participants attended or are currently attending college (91.8%). Forty-four (44.9%) of the respondents had been or were currently enrolled in an agricultural or home economics major. The data are reported in Table 2.

Insert Table 2 here

Of the total respondents who had not or were not enrolled in agriculture or home economics majors, 24 (24.5%) had been enrolled in an agricultural major at one time. Reasons given for changing majors included: change of interest, relocation, curriculum changes, employment, or feelings that the program or facilities were inadequate.

Objective three was to determine if there was a relationship between demographic characteristics and factors influencing career choice for the Beginning Scholars participants.

Spearman's Rho correlation coefficients were used to determine if a relationship existed between demographic variables and career choice. Three variables - FHA, FFA, and 4-H, had a moderate positive relationship. Participants who were members of these organizations were more likely to enroll in agriculture or home economics majors. Rural background had a low positive relationship. Other variables had little, if any, influence on selection of a career. Interpretation of the correlations was based on the set of descriptors proposed by Hinkle, Wiersma, and Jurs (1979). The data are reported in Table 3.

Insert Table 3 here

The fourth objective was to identify the significant factors concerning career choices. The overall score on each of the influencing factors was obtained by averaging the scores of all of the questions pertaining to each particular factor. By calculating the mean, a measure of each factor was obtained. Table 4 displays the mean score of the seven factors with Beginning Scholars having the highest mean score, followed by institution, parents, personal interests, adults other than parents, background, and recruitment methods other than the Beginning Scholars program.

Insert Table 4 here

The factor **Beginning Scholars Program** was influential towards both enrollment at the University of Arkansas, and decisions for educational and career goals of these participants with mean scores of 4.07 and 4.01, respectively.

The factor **institution**, had the second highest overall mean score of the seven factors. The curriculum offered was ranked highest within this group followed by the financial cost of attendance and academic prestige of the institution. Location was not as important as academic offerings and most participants considered an hour and a half as "close to home" in driving distance.

The participants perceived that their **parents** greatly influenced their decisions concerning education, however, parents were relatively uninfluential in actual career selection.

The possible job opportunities had the highest mean for the category **personal and career goals**, followed by the prestige of the career and potential income.

Within the factor **adults other than parents**, a faculty member at the institution exerted the most influence on career choice followed closely by a person in the area of interest. These respondents rated high school guidance counselors as having the least influence concerning career choice.

High school curriculum had the greatest influence of any variable in **background.** Participation in high school vocational agriculture or home economics was perceived to have relatively little influence, but this may be due to the fact that less than half of the participants were members in FFA, FHA and 4-H.

A visit to the institution ranked as the most influential recruitment method within the factor **recruitment techniques**. Recruitment brochures had relatively little influence upon respondents decisions. The influence of a slide or tape presentation, newspaper or magazine articles, and television or radio advertisements received low mean scores because few of the participants had experienced any contact with these methods.

An analysis of variance was used to determine which factors were significant in affecting career choice of these respondents. The Beginning Scholars program, adults and background were significant at the .05 level. The results are shown in Table 5.

Insert Table 5 here

Chi square test of independence was used to determine if the responses were distributed independently of educational or career choice.

Respondents who were reared in towns of less than 5,000 in population comprised the greatest percentage of College of Agriculture or Home Economics enrolles. Respondents who enrolled in agriculture or home economics responded 'yes' more often than other majors on the seven influencing factors.

The largest difference existed for the influence of participation in the Beginning Scholars program, followed by employment in an agricultural related job at some time. The data revealed that 53.7% perceived that participation in the Beginning Scholars influenced their enrollment in a college of agriculture or home economics. Over forty-one percent of respondents felt that their employment in an agricultural related job influenced them. Parents were also an influencing factor as 34.8% of the respondents perceived that their parents influenced them to enroll in an agriculture or home economics major. This is shown in Table 6.

Insert Table 6 here

CONCLUSIONS

Approximately 95% of Beginning Scholar Participants received some type of post secondary education, with approximately 90% of the participants enrolled in college. Over one-half of the participants had made educational and career choices by the tenth grade. Forty-nine percent of the participants had been or were currently enrolled in a college of agriculture or home economics. Twenty-five percent of those in other majors had been enrolled in an agriculture or home economics major at some time. The Beginning Scholars program had the highest mean of any grouped factor concerning the seven major influences. Other recruitment methods had the lowest mean. A moderate positive relationship was found between participation in FHA, FFA and 4-H. Rural background had a low positive relationship. Three factors were found to influence career choices of these respondents: Beginning Scholars Program, Adults (non-parents) and Background. Significant differences were found for respondents who enrolled in an agricultural or home economics major regarding the influence of parents, employment in an agriculture related job, and the Beginning Scholars program.

Based upon these findings, it is apparent that the Beginning Scholars program has had a significant impact upon the career decisions of participants.

RECOMMENDATIONS

The findings of this study should be made available to the administrators of the College of Agriculture and Home Economics, University of Arkansas, Fayetteville. Also, those individuals responsible for recruitment programs for the departments within the college should be made aware of these results. Additionally, those individuals involved in recruitment through the admissions office and other colleges that conduct summer programs for high school students should be interested in these findings.

Further investigation into this area is needed:

1. To replicate the study with students who did not participate in the program but are agricultural or home economics majors.

2. To compare students with average scholastic ability to students of high ability concerning career choices.

3. To randomly select students majoring in agriculture or home economics for longitudinal studies to determine the factors influencing their career choices.

4. To study the image of agriculture and home economics careers as perceive by high school students in the state.

5. That the college should develop a similar educational program and provide information for adults who significantly influence student's career decisions.

6. The college should support FFA, FHA and 4-H programs to strengthen recruitment within these groups.

Regardless of whether it is the hands on experiences, the exposure to areas of agriculture and home economics fields or a change in the perception toward agriculture or home economics as a career, it is evident that the Beginning Scholars program is effective in influencing these high ability students. Consideration should be given to changing the requirements from the junior to the sophomore year of high school.

Exposure to agriculture and home economics career fields is becoming an important means of recruiting students. Since there are many misconceptions concerning careers available in agriculture and home economics, it is important that hands-on programs like the Beginning Scholars be continued.

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Table 1
GRADE AT WHICH EDUCATIONAL AND CAREER
DECISIONS WERE MADE
n=98

Grade	Frequency	Percent
Prior to the 9th	19	19.4
9th grade	18	18.4
10th grade	21	21.4
11th grade	20	20.4
12th grade	0	0.0
After 12th	17	17.3
Undecided	3	3.1

Table 2
ENROLLMENT OF BEGINNING SCHOLARS BY COLLEGE
n=98

College of Enrollment	Frequency	Percent
Agriculture/Home Economics	44	49.4
Arts & Sciences*	28	31.5
Other**	17	19.1

*includes biology, chemistry, geology, math, and other sciences
**includes architecture, engineering, education and business

Table 3
SPEARMAN RHO CORRELATIONS BETWEEN SELECTED
VARIABLES AND INFLUENCE ON CAREER CHOICE
n=98

Influence	Coefficient	p	Correlation
FHA Participation	.60	.001	moderate
FFA Participation	.58	.000	moderate
4-H Participation	.48	.010	moderate
Rural Background	.34	.001	low
Farm Background	.12	.120	little, if any

Table 4
MEAN SCORES OF FACTORS INFLUENCING CAREER CHOICES AS PERCEIVED BY BEGINNING SCHOLARS RESPONDENTS
n=98

Variable	Mean	Standard Deviation	Low	High
Scholars Program	4.04	1.77	0.00	6.00
Institution	3.73	1.09	1.25	5.75
Parents	3.63	1.45	0.00	6.00
Personal Interests	3.52	1.15	0.25	5.75
Adults (non-parent)	2.90	1.06	0.57	5.71
Background	2.67	1.50	0.00	6.00
Recruitment	2.09	0.99	0.00	4.83

Table 5
ANALYSIS OF VARIANCE OF CAREER CHOICE BY INFLUENCING FACTORS

Group Factor	DF	F-Ratio	Prob. F
Beginning Scholar Program	2	11.31	0.0001*
Institution	2	0.13	0.8772
Parents	2	0.76	0.4686
Personal Interests	2	0.47	0.6236
Adults (non-parent)	2	3.71	0.0285*
Background	2	6.80	0.0018*
Recruitment	2	1.30	0.2670

*P <.05

Table 6
FACTORS INFLUENCING CAREER CHOICE OF BEGINNING SCHOLARS PARTICIPANTS

	Percent of Participants Responding 'Yes'			
Influence	AGHE Major	ARSC Major	Other Major	Chi-Square
Size of Hometown	49.4	31.5	19.1	4.59
Rural Background	41.6	23.6	16.9	1.51
Farm Background	25.8	11.2	7.9	2.02
Parents	34.8	12.4	10.1	6.96*
Relatives	33.7	16.9	9.0	2.88
Ag-related Job	41.6	18.0	6.7	14.60**
Beginning Scholars	53.7	29.3	17.1	23.21**

*p<.05 **p<.01

AGHE - Agriculture and Home Economics
ARSC - Arts and Sciences

THE EFFECTIVENESS OF THE BEGINNING SCHOLARS PROGRAM IN ATTRACTING HIGH ABILITY STUDENTS TO THE COLLEGE OF AGRICULTURE AND HOME ECONOMICS

A Critique

Joe A. Gliem, The Ohio State University - - Discussant

The authors need to be commended for studying a problem that is of utmost importance to Colleges of Agriculture and indeed could be a focal point in discussions and decisions relative to their survival in the next decade.

I do not intend to spend time looking at the appropriateness of the research design, methodology, nor the statistical analysis of the study. A critique of these items should have been done in the review process and concerns pertaining to these issues should have been grounds for disqualification at that time. Now is not the time to humiliate nor crucify the authors for errors that should have been detected at the onset. Rather, I would like to raise questions and make comments that hopefully will cause one to continue the search for answers in this important area.

With this as background, I would raise the following questions:

1. Would students have attended the College of Agriculture and Home Economics without having attended the Beginning Scholars Program? With only forty-nine percent of the participants currently enrolled or having been enrolled in the college, could resources have been more effectively used elsewhere? Returns on investment with different recruitment strategies may be an important research effort. The research findings left no doubt as to the positive influence of the Beginning Scholars Program, but would the results have been different without it?

2. Are we looking at the right end of the recruitment process? What does agriculture have to offer to its' graduates? Stop and ponder the question, "If my son or daughter was extremely bright, articulate, well groomed, personable, etc., etc., would you encourage them to seek a career in Agriculture?" I'm not sure that just having jobs available is the answer. An equally important question might study the quality of the job.

Once again, let me thank the authors for the time and efforts they expended in this research effort. Please be assured that I am not trying to diminish the value of this study but simply trying to provoke thought and discussion as to future research directions.

ANALYSIS OF ENROLLMENT IN AGRICULTURAL SCIENCE AND MEMBERSHIP IN THE FFA IN TEXAS

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INTRODUCTION

Beginning with A Nation at Risk in 1983, numerous reports were issued throughout the 1980s calling for educational reform in the United States. These reports resulted in sweeping educational reforms enacted by state legislatures nationwide. In Texas, significant educational changes were initiated in 1984 by House Bill 72. One of the outcomes of this bill was major reform in secondary agricultural education. In 1988, the traditional program of Vo-Ag I, II, III, and IV was phased out and replaced with twenty-three, semester-length courses. These courses were designed to reflect a diversified and changing agricultural industry. In addition to the course changes, requirements for Supervised Agricultural Experience Programs (SAEP) were changed.

December, 1988 enrollment figures for secondary students enrolled in Agricultural Science programs in Texas revealed an increase of 29% over the previous year's enrollment. This amounted to an increase of approximately 10,000 students. FFA membership increased by 13% or approximately 3,000 students (Domangue, 1989). In light of what is known about why students enroll in secondary agricultural education and in light of such a drastic increase in enrollment in Texas, were there "new" reasons why students enrolled in the new semester courses in Texas? Was it scheduling concerns? Was it the nature of the curriculum? What was the demographic make-up of these students? Was the new program attracting "non-traditional" students? What motivated so many additional students to enroll but not join the FFA? In addition, what were the students' perceptions of the requirements for SAEP? This study sought to answer these and other questions.

An understanding of the behavior of high school students is founded in adolescent psychology. Horrocks (1976) states that "human behavior occurs either as a product of an individual and his environment or as the result of a physiological intrapersonal reaction" (p. 188). Some major external factors that influence adolescent behavior are the high school (Newman & Newman, 1979), the family (Lloyd, 1985), and the peer group (Thornburg, 1982). Internally, the adolescent is influenced by the drive to resolve identity, seek emancipation from parents, seek economic independence, establish group and heterosexual relationships, develop intellectually, and develop and establish values. The physical changes associated with adolescence also produce a great deal of internal stress (Horrocks, 1976).

Several factors related to enrollment in programs of vocational agriculture have been identified. They include future value or future plans (Gilbertson, Rathbun, & Sabol, 1975; Pruckno & Miller, 1985; Brandy, 1986;

Scanlon & Yoder, 1989), interest in agriculture or vocational agriculture (Pruckno & Miller, 1985; Brandy, 1986), influence of significant others (Flores, 1989; Scanlon & Yoder, 1989), and academic average, parental occupation, and student residence (Scanlon & Yoder, 1989). Reasons for enrollment cited by students include to show at fairs, to meet the science requirements (Gilbertson, et al., 1975), to be a better citizen, and to improve relations with others (Scanlon & Yoder, 1989).

Students join the FFA to participate in project activities, to show at fairs (Gilbertson, et al., 1975), to learn about agriculture and leadership, to participate in activities (Paulson, 1981), and for leadership development, interpersonal skill development, and career exploration (Scanlon & Yoder, 1989).

PURPOSE AND OBJECTIVES

The purpose of this study was to examine relationships among selected characteristics of agricultural science students in Texas, their reasons for enrolling in agricultural science classes, their reasons for joining the FFA, their reasons for not joining the FFA, and their perceptions concerning the requirements for SAEP. The following objectives were identified to accomplish this purpose:

1. Determine selected personal and situational characteristics (e.g., age, gender, ethnicity, place of residence, year of enrollment) of students enrolled in agricultural science programs in secondary schools in Texas.
2. Determine if relationships existed among selected personal and situational characteristics.
3. Determine reasons for enrollment, reasons for joining or not joining the FFA, and perceptions of the requirements for SAEP of secondary agricultural science students in Texas.
4. Determine if relationships existed among the aforementioned personal and situational characteristics and the students' reasons for enrolling in agricultural science, reasons for joining the FFA or not joining the FFA, and perceptions of SAEP.

PROCEDURES

The population for this study was all secondary students enrolled in agricultural science in Texas in the fall, 1989. This number was approximately 67,000 students. Cluster sampling was used with the agricultural science program as the cluster. A random sample of thirty-five schools was selected to participate, with an expected sample size of 2,380 agricultural science students.

Th instrument consisted of five parts (Marshall, 1990). Part I was designed to gather demographic and situational information from the respondents. Parts II, III, IV, and V were designed to determine the reasons for enrollment, perceptions of SAEP, reasons for joining the FFA, and reasons for not joining the FFA, respectively. These parts consisted of statements to which the students responded using a five-point, Likert-type scale of 1=Strongly Agree, 2=Agree, 3=Unsure/No Opinion, 4=Disagree, 5=Strongly Disagree.

The original bank of items for the instrument was compiled from instruments developed by Flores (1989), Scanlon and Yoder (1989), and Paulson (1981). Items were added by the faculty and doctoral students in the

Department of Agricultural Education at Texas A&M University, the state staff in Agricultural Education at the Texas Education Agency, and by the students from three local agricultural science programs who participated in the pilot study.

During the week of November 6-10, 1989, packets of research materials were mailed to the 34 (of 35) teachers agreeing to participate in the study. Teachers were instructed to administer the questionnaire to each student in the program. Thirty-one schools completed and returned the scantron sheets. The final sample size was 1,697 students.

ANALYSIS OF DATA

Data were analyzed using SPSS^{x} on the mainframe computer at Texas A&M University. Objective 1 was accomplished by computing means, frequencies, and percentages on the demographic items. Objective 2 was accomplished by conducting crosstabulations on selected demographic variables. Objective 3 was accomplished by factor analyzing the items comprising the reasons for enrollment, reasons for joining, reasons for not joining, and perceptions of SAEP. Then, means and standard deviations were calculated and reported. Objective 4 was accomplished by conducting analysis of variance of the factors of enrollment, joining, non-joining, and perceptions of SAEP. Subjects were grouped through use of the demographic variables.

RESULTS

FINDINGS RELATED TO OBJECTIVE 1

A majority of the respondents were 16 or 17 years old (52%), male (77%), and Anglo (71%). Twenty-three percent lived on a farm or ranch, thirty-one percent lived in the country but not on a farm or ranch, and twenty-seven percent lived in a town with a population less than 5,000. Forty-three percent were new to the program, and seventy-one percent were FFA members.

FINDINGS RELATED TO OBJECTIVE 2

The variable of interest in Objective 2 was the year respondents first enrolled in agriculture. This was examined to determine if differences existed between the students who were enrolled in agriculture before the programmatic changes were implemented and were still enrolled and the students who enrolled for the first time after the programmatic changes were implemented. This was examined by conducting crosstabulations of the variable "Year of First Enrollment" and selected demographic variables. Conventions used for describing measures of relationship were defined by Davis (1971). A coefficient of .70 or higher was considered a very strong relationship. A coefficient of .50 to .69 was considered a substantial relationship; .30 to .49 was considered a moderate relationship; .10 to .29 was considered a low relationship; and .01 to .09 was considered a negligible relationship.

The results of the crosstabulations of the variable "Year of First Enrollment" and selected demographic variables are found in Table 1. A negligible relationship was discovered between the year respondents first enrolled in agriculture (1986-87, 87-88, 88-89, or 89-90) and their ethnicity. A low relationship was found between the year of first enrollment and gender, residence, and type of SAEP conducted. Recent enrollees were composed of a higher percentage of females, a higher percentage of those who lived in cities with populations between 5,000 and 50,000, and a higher percentage of those conducting a SAEP consisting of applied activities or no SAEP at all. They also were composed of a lower percentage of those who lived on farms and ranches. It should be noted that students enrolled in the beginning semester course in agriculture are not required to conduct a SAEP. This would account for the high percentage of new enrollees not conducting a SAEP.

A moderate relationship was found between year of first enrollment and status of FFA membership. A higher percentage of new enrollees had not been FFA members in the past. A relatively high Cramer's V would be expected considering that new enrollees could not have been members in the past. The largest percentage of non-members was found in the 1989-90 enrollees.

Table 1

Results of Crosstabulations of "Year of First Enrollment" by Selected Demographic Variables

Variable	Cramer's V	Chi Square	Prob.
Gender	.10	16.36	.001
Ethnicity	.07	24.32	.018
Residence	.11	56.56	<.0001
FFA Membership Status	.46	1052.39	<.0001
Type of SAEP Conducted	.14	100.75	<.0001

FINDINGS RELATED TO OBJECTIVE 3

The items concerning enrollment, joining, non-joining, and perception of SAEP were grouped conceptually and factor analyzed. The resulting factors were submitted to a professional psychologist for assistance in identifying names for the factors (Hughes, Personal Communication, May 1, 1990). The factors, their means, standard deviations, and Cronbach's alphas are displayed in Table 2.

The factor "Class Characteristics" was composed of items concerned mainly with students' perceptions of what they would be doing in the class. "Identity Enhancement" consisted of items that indicated a positive effect on the adolescent developmental task of identity resolution. This includes perceived future value, relationships with adults (the teacher), perceived present value (classes are fun), and internal needs such as respect, acceptance, and belongingness. "Agricultural Interest" included items that indicated an intrinsic interest in agriculture on the part of the student. "Instrumental/Practical" included items indicating that the class was used as an instrument for other purposes or that they enrolled for other practical reasons. "Significant Others" included items indicating that the student enrolled because of outside influence of other people. "Circumstantial/ Disavowance" included items indicating that the student enrolled because of reasons beyond their control; in other words, they disavowed responsibility for being in the class. Reasons for this included being put in the class by the people who do the scheduling or enrolling because it was the only elective available.

Table 2

Means, Standard Deviations, and Cronbach Alphas of the Scales Measuring Influences on Enrollment, FFA Membership, FFA Non-Membership, and Perception of SAEP

Rank	Factor	Mean	SD	Cronbach's Alpha
Influences on Enrollment				
1.	Class Characteristics	2.00	.70	.57
2.	Identity Enhancement	2.06	.72	.83
3.	Agricultural Interest	2.22	.87	.74
4.	Instrumental/Practical	2.33	.69	.60
5.	Significant Others	3.28	.85	.80
6.	Circumstantial/Disavowance	3.50	.90	.58
Influences on FFA Membership				
1.	Identity Enhancement	2.11	.68	.87
2.	Organizational Activities	2.39	.73	.80
Influences on FFA Non-Membership				
1.	Pragmatics	3.15	.88	.46
2.	Ego-Dystonic/Isolation	3.46	.81	.87
3.	Negative Image	3.81	.79	.74
Perception of SAEP				
1.	Perception of SAEP	2.57	.73	.87

Note. 1=Strongly Agree, 2=Agree, 3=Unsure/No Opinion, 4=Disagree, 5=Strongly Disagree

The procedure resulted in two factors measuring membership in the FFA: "Identity Enhancement" and "Organizational Activities." "Identity Enhancement" consisted of items similar to those found in the enrollment factor "Identity Enhancement." In other words, students may have joined the FFA or enrolled in agricultural science for reasons of "Identity Enhancement." "Organizational Activities" included items indicating the students joined because of activities offered by the FFA in which they could participate.

The factor analysis procedure resulted in three factors influencing non-membership in the FFA. "Pragmatics" consisted of items of a factual or practical nature that prevented students from joining. "Ego-Dystonic/Isolation" consisted of items indicating a student's personal sense of isolation relative to the FFA. This is the opposite of identity enhancement. The student does not identify with the FFA and does not see the FFA as contributing to any portion of the task of identity development. "Negative Image" consisted of items indicating a negative image of the FFA either held internally by the student or projected externally by other people to the student.

The factor analysis procedure resulted in only one factor for the area of SAEP: "Perception of SAEP." This included items concerning various aspects of the new requirements for SAEP in Texas.

FINDINGS RELATED TO OBJECTIVE 4

Objective 4 was accomplished by conducting analysis of variance with the scales resulting from the factor analysis measuring enrollment, membership, non-membership, and perception of SAEP as the dependent variables and selected demographic variables as the independent variables. Differences in means at the .01 level were considered practically different. Where significant differences were detected, Scheffe's post hoc procedure was used to detect between which groups the differences occurred. Ninety-three ANOVA's were conducted. Only those that were statistically as well as practically significant ($p<.01$) are reported.

Blacks disagreed less than Hispanics and Anglos that they enrolled because of circumstantial/disavowance reasons. It is interesting to note that Hispanics did not differ from Anglos in any of the ANOVA's conducted using ethnicity as a variable.

Students who lived on farms and ranches agreed more than all other groups with all factors of enrollment (except "Circumstantial"), FFA membership, and SAEP. They differed on all factors except "Class Characteristics" and "Circumstantial" from those who lived in the country but not on a farm or ranch.

Students who enrolled for the first time in the fall of 1989 agreed less than all other "first enrollment" groups on all factors of enrollment except "Circumstantial/Disavowance." Those who were enrolled the longest agreed more than recent enrollees that they enrolled because of "Instrumental/Practical" reasons.

FFA members agreed more than non-FFA members on all factors of enrollment except "Circumstantial/Disavowance." No differences existed between these two groups in regards to perception of SAEP.

CONCLUSIONS AND RECOMMENDATIONS

Even with massive changes in secondary agricultural education in Texas, enrollment is still mainly rural, white males. Considering that agricultural educators "value serving all populations" (National Summit on Agricultural Education, 1989) and that total secondary enrollment in Texas is approximately 50% males and 50% females, and 48% minorities, professionals in agricultural education in Texas must plan and implement strategies to recruit and retain ethnic minorities, females, and urban students.

Overall, students enroll in programs of agricultural science in Texas because of characteristics of the class and because it enhances their identity as a person. They join the FFA mainly because it, too, enhances their identity as a person. To a lesser degree, they join to become involved in its activities. Modifications to existing semester courses, addition of new courses, and modifications to the FFA should address the interest and identity concerns of a diverse student population.

Because the focal point of enrollment in agriculture classes and membership in the FFA is at the local level, an instrument should be developed for use by the local agriscience instructor to identify enrollment and membership concerns within the local agriculture program. This instrument could be used together with interest inventories to assist the instructor in program planning.

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ANALYSIS OF ENROLLMENT IN AGRICULTURAL SCIENCE AND MEMBERSHIP IN THE FFA IN TEXAS

A Critique

Joe A. Gliem, The Ohio State University -- Discussant

The authors need to be commended for studying a problem that is of utmost importance to agricultural education in the United States today. For without relevant change in our programs that impact favorably upon enrollments, we may very well go the way of the dinosaurs.

I do not intend to spend time looking at the appropriateness of the research design, methodology, nor the statistical analysis of the study. A critique of these items should have been done in the review process and concerns pertaining to these issues should have been grounds for disqualification at that time. Now is not the time to humiliate nor crucify the authors for errors that should have been detected at the onset. Rather, I would like to raise questions and make comments that hopefully will cause one to continue the search for answers in this important area.

With this as background, I would raise the following questions:

1. The authors state, "Even with massive changes in secondary agricultural education in Texas, enrollment is still mainly rural, white males." This causes one to ponder if the changes were massive in terms of content or were they massive in terms of the time spend in trying to justify what was already occurring? Has the content of the curriculum really changed, or are we still doing the same thing but putting it into a different wrapper and marketing it differently?

2. Does Agricultural Science infer that the requirements in the Natural Sciences have been increased, or are we fooling ourselves by trying to teach at a level that is above the capability of our students and maybe even ourselves.

3. Is the dramatic increase in Texas's Agricultural Science enrollment simply the result of a new program name? Will this enrollment remain steady? Should it?

4. Can agricultural education be everything to everyone with the resources currently available?

Once again, let me thank the authors for the time and efforts they expended in this research effort. Please be assured that I am not trying to diminish the value of this study but simply trying to provoke thought and discussion as to future research directions.

FACTORS INFLUENCING SECONDARY MICHIGAN AGRICULTURAL STUDENTS' DECISIONS NOT TO JOIN THE FFA

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INTRODUCTION

Within the last 14 years there has been a significant decline in the number of students enrolled in agricultural education classes in secondary schools in the United States. Along with this drop in enrollment there has been a drastic drop in the number of students who have become members of the National FFA Organization. In 1976 FFA membership peaked at 509,735 (Harris, 1986, p.8). The National Future Farmer Magazine (1988-89, p.8) revealed that 1988 national FFA membership stood at 404,900. This was a drop of 104,835 members or a decline of 21% since the peak membership year of 1976.

The FFA membership figures in the State of Michigan reflected a more severe drop in membership. The Michigan Association of FFA had 10,493 members in 1977. This number declined to 5,427 members in 1988 or a decline of 48% (Richard Karelse, personal communication, March 24, 1989). Despite increased recruitment efforts by the FFA organization membership in the FFA has continued to decline.

Selland (1968, p. 110) surveyed FFA members and non-members to determine if significant differences existed between the two groups. Selland found that "a high percentage of both members and non-members indicated that such factors as transportation, work responsibilities during the time of meetings, and conflict of meeting time with other clubs were not problems in their being able to attend FFA meetings." Selland also concluded that residence was not a factor affecting membership in the FFA, participation in other activities did not affect membership in the FFA, and transportation to activities was not a problem affecting membership. Selland did find that an agriculture student's decision on joining the FFA was affected by whether or not their friends were FFA members.

Parker (1974, p.62) surveyed administrators, teachers, and students in urban schools and found that a majority disagreed with the statement that "members of the FFA in this school are looked at as 'smart' and 'good' kids." Parker also found that the reason most often cited for not joining the FFA was that "the organization did not sound interesting." Parker also found that only six percent of the students surveyed indicated that the reason they did not join the FFA was that "it costs too much." Interestingly enough, Cooper and Nelson (1983, p.20) also studied the effect dues had on FFA membership. They concluded that "only 6% of the non-FFA members indicated the cost of belonging to FFA prevented them from joining."

PURPOSE AND OBJECTIVES

The purpose of this study was to determine why agricultural education students decided not to join the FFA, and to determine if differences existed between various groups of students as to why they did not join the FFA. The specific objectives of this study were:

1. Determine if a student's financial situation played a part in the student's decision on whether or not to join the FFA chapter;
2. Determine if other extra-curricular activities interfered with FFA membership;
3. Determine if student's peers influenced their decision to not join the FFA; and
4. Determine if a student's place of residence influenced whether or not they joined the FFA.

PROCEDURES

The target population for this study was all students enrolled in agricultural education classes in Michigan during the 1988-89 school year who were not members of the Michigan Association of FFA. The accessible population was all non-FFA member agricultural students in seventy-five percent of Michigan agricultural education programs that had FFA chapters during the 1988-89 school year. Simple random sampling was used to select 88 schools in Michigan to take part in the survey.

The survey that was developed was a Likert type questionnaire. Borg and Gall (1984) wrote that "Likert Scales are probably the most common types of attitude scales constructed." The survey included 31 Likert scale type questions and eight open-ended questions. Approximately eight Likert questions pertained to each of the objectives. These questions pertained to the four objectives of the study, as well as general topics of interest. Tuckman (1972) stated that "The unstructured response, perhaps more commonly called the open-ended question, allows the subject to give his (her) own response in whatever form he (she) chooses."

The survey instrument was reviewed and field tested for improvement, clarity, validity, and reliability. The following procedures were used: (1) selection of a panel to judge content validity, (2) field testing of the instrument for reliability, and (3) reliability testing of the instrument using Cronbach's Alpha Coefficient. Reliability coefficients were determined for the four objectives. Alpha levels for the four objectives ranged from (.63) to (.76).

ANALYSIS OF DATA

The data was analyzed using the Statistical Package for the Social Sciences (SPSS, Inc., 1987) SPSS/PC+ version. Alpha was set a prior at the .05 level of significance. Three statistical methods were used to analyze the data:

1. The Likert scale questions were analyzed using descriptive statistics such as frequencies, percentages, means, and standard deviations;
2. T-tests and Analysis of Variance (ANOVA) were used to examine differences between the students pertaining to gender, grade level, geographic residence, and number of semesters of agricultural class completed; and
3. The open-ended questions on the survey were analyzed by using qualitative research methods. Each response was placed into one of several categories.

RESULTS

Eighty-eight schools were chosen for inclusion in the study; of that number, 54 responded, for a 67% response rate. The total population of this study was 441 non-FFA member agricultural students. This included male and female agricultural education students who were not members of the FFA in 45 high school agriculture programs in the state of Michigan.

From the total sample of 441 students, 66% (289) were male and 34% (152) were female. The survey found that 35% (154) of the respondents lived in a town, 18% (80) of the respondents lived on a rural farm, and 46% (202) lived in a rural area but not on a farm. The population was made up of 32% (143) freshmen, 33% (147) sophomores, 21% (94) juniors, and 13% (57) seniors. The surveys indicated that 30% (126) had completed one semester of agriculture class, 43% (183) had completed two semesters, 10% (42) had completed three semesters, 12% (51) had completed four semesters, 1% (5) had completed five semesters, and 5% (20) had completed six semesters of agriculture class.

The means indicated that on most questions, males and females did not feel that financial factors prevented them from joining the FFA. However, the t-test indicated that there was a significant difference between males and females on the financial reasons why they did not join the FFA.

The means for respondents by their place of residence showed that none of the three groups felt that financial factors prevented them from joining the FFA. However, once again there was a significant difference in the means of the respondents by where they resided. Respondents who lived on a rural farm were significantly different from the groups of respondents who lived in a town, or in a rural area but not on a farm.

The means for the last two groups of respondents by grade level and number of semesters of agricultural class completed indicated that financial factors did not prevent the respondents from joining the FFA.

The results for the four groups of students indicated that they felt that time constraints did not prevent them from joining the FFA. Also there was no significant differences in the means within the four groups pertaining to the time variables.

Peer variables were also found not to be a hinderance to FFA membership. No significant differences were found within the four groups of respondents pertaining to the peer variables.

Non-FFA member agricultural students indicated that they did not feel that geographic constraints prevented them from joining the FFA. There was a significant difference in the means of respondents by different grade levels. Tukey test results indicate that freshmen significantly differed from other classes on their responses to geographic variables. This is probably due to the fact that most freshmen do not possess a driver's license and therefore have more difficulty attending FFA activities.

RESEARCH QUESTIONS

The following are eight research questions that were included in the non-FFA member survey. These questions were open-ended and asked the students their opinions on several subjects related to this study. The questions either related directly to one of the four objectives or were general questions that pertained to the entire study.

1. What kind of extra-curricular activities do you participate in after school?

The majority of non-FFA members, 41% (172), indicated that sports was the extra-curricular activity in which they most often participated. Work, cars, friends, and clubs were also listed as other extra-curricular activities that took up non-FFA members' time. The following are comments made by the non-FFA members who were surveyed.

> "Football - wrestling and in the spring I work on a farm"
>
> "Work and work on cars"
>
> "Spending time with friends"
>
> "Student council, national honor society, S.A.D.D."

2. What was the most important factor that influenced your decision to not join the FFA?

A very large majority, 54% (183), responded that the most important factor that influenced their decision on FFA membership was their level of interest in agriculture. Other factors that influenced the respondents decision on membership included time constraints, friends not in agriculture, money, or transportation. The following are quotes from non-FFA members on important factors that influenced their decision on FFA membership.

> "I'm not interested"
>
> "Not enough time"
>
> "My friends"
>
> "Dues too expensive"

3. How do you and your fellow students feel about the agricultural education students who join the FFA and participate in chapter activities?

A majority of non-FFA members, 34.5% (140), indicated that they felt that FFA members were nice students who were no different from non-FFA members. A smaller group of respondents indicated that they felt that FFA members were successful, ambitious students. Other groups of respondents indicated that they did not care, or that FFA members were disliked. Some of the comments were:

> "They are all pretty nice"
>
> "We like them and we think there {sic} doing a great job."
>
> "Don't even think about it"
>
> "They're Farmers"

4. What would have influenced you to join the FFA?

The largest group of respondents, 34.7% (137), indicated that "nothing" would have influenced them to have joined the FFA. Other groups indicated that if they had more time, or more friends in the FFA they would have joined. Smaller groups of respondents indicated that more interesting activities, or more knowledge about the FFA would have influenced them to join the FFA. Additional comments were:

> "Nothing, I don't like farming"
>
> "If my friends joined"
>
> "More interesting"
>
> "Knowing more about it"

5. Define agriculture.

The majority of responses, 43.4% (158), included references to farming, plants, or animals. A very small percentage, 6.3%, responded that agriculture had something to do with science. Some of the definitions were:

> "Study of farming"
>
> "Agriculture is the growth, harvest, and sales of crops."
>
> "Agriculture is the science of producing crops, animals, and other things for public consumption."
>
> "Hard work that pays squat" {sic}

6. Why did you enroll in agricultural education class(es)?

Roughly 45% (170) non-FFA members responded that they were either interested in agriculture, they needed a science credit, they thought it would be an easy class, or they were forced to enroll. Some additional reasons given were:

> "Because I wanted to learn more about horses"
>
> "Because I needed a science credit"
>
> "Easy science credit"
>
> "I got stuck in it and couldn't get out"

7. In your opinion, what is the best way to help cover the costs associated with FFA membership?

Thirty-four percent (119) non-FFA members indicated that they thought the best ways of covering the costs of FFA membership were; fund raisers, individual jobs, parents, or the chapter treasury. Some additional fundraising methods suggested included:

> "More FFA sales"
>
> "Working on farm"
>
> "Get a part time job"
>
> "Have parents pay for it"
>
> "Club pays expenses"

8. What kind of experiences or background do you have in agriculture?

The largest group of respondents, 30.4% (118), indicated that they had a variety of different experiences in the area of agriculture. The largest group indicated that they had little or no experience. Other groups responded that they worked on a farm, lived on a farm, raised animals, had relatives who lived on a farm, gardened, or participated in agricultural class activities. Some additional responses were:

> "Absolutely nothing"
>
> "I helped on a farm during summer"
>
> "I live on a farm and work on a dairy farm"
>
> "I have been around farm animals all my life although I don't live on a farm. Some of my relatives do."
>
> "My dad owns a farm and I work on it in the summer"
>
> "I've planted gardens & flowerbeds but that's about it."

CONCLUSIONS

Based on the results of this study, the following conclusions were formulated:

1. Financial problems did not restrict respondents from joining the FFA organization.

2. Time conflicts with other activities did not stop respondents from joining the FFA.

3. An agricultural education student's friends did not influence their decision on membership in the FFA.

4. Geographical factors did not prevent respondents from joining the FFA.

5. Males and females differed in their reasons why they chose not to join the FFA organization.

6. Respondents with different places of residence differed in their reasons for not joining the FFA.

7. Non-FFA members spent a lot of their free time playing sports or working at jobs after school.

8. Respondents did not perceive any benefits to FFA membership.

9. FFA members were seen as nice students who were ambitious and successful in their FFA activities.

10. Non-FFA members felt that nothing would have convinced them to join the FFA.

11. Non-FFA members had a very limited knowledge of the subject areas that are included in the field of agriculture.

12. Non-FFA members had an interest in learning about agriculture even if they did not wish to join the FFA.

13. Respondents felt that fund raisers should be used to help defer the costs associated with FFA membership.

14. Non-FFA members had a wide range of experiences in agriculture that could have been used as a base to peak their interest in agriculture and the activities of the FFA.

RECOMMENDATIONS

The following recommendations were made:

1. FFA chapters should make every effort to ensure that all agricultural education students are able to attend meetings and other activities.

2. FFA chapters should strive to offer activities for both rural and non rural students.

3. The non-agriculture related benefits to FFA membership should be expressed to all students in agricultural classes.

4. An alternative dues structure should be investigated to alleviate the burden of requiring students to pay for activities that are intra-curricular to the agricultural curriculum.

5. The agriculture experiences of non-FFA members should be used as a base to develop new courses that would be of interest to all students. These classes should be geared to the interests of students who want a basic knowledge about related agriculture pursuits.

6. New FFA programs on the local, state, and national level should be developed that would be directed toward projects in which non-farm students are likely to show interest.

7. Additional research studies should be undertaken that would survey FFA members to determine their reasons for joining the FFA.

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FACTORS INFLUENCING
SECONDARY MICHIGAN AGRICULTURAL STUDENTS' DECISIONS NOT TO JOIN THE FFA

A Critique

Joe A. Gliem, The Ohio State University -- Discussant

The authors need to be commended for their time and efforts in studying factors relative to the declining FFA membership trend. While at first glance this may appear to be a problem, it may be more perceived than real relative to the educational benefits derived.

I do not intend to spend time looking at the appropriateness of the research design, methodology, nor the statistical analysis of the study. A critique of these items should have been done in the review process and concerns pertaining to these issues should have been grounds for disqualification at that time. Now is not the time to humiliate nor crucify the authors for errors that should have been detected at the onset. Rather, I would like to raise questions and make comments that hopefully will cause one to continue the search for answers in this area.

With this as background, I would raise the following questions:

1. If FFA is considered as a intracurricular activity (something we have preached for years and years and years) why must one pay dues to be a member. Further, if the FFA is merely an extension of the agricultural education curriculum, and leadership skills are taught as a part of the curriculum, what does one lose by not belonging to the FFA?

2. If FFA is intracurricular, why should individuals pay dues to keep the organization running? Why shouldn't the school or some other means of support provide these expenses?

3. Should the National FFA Organization do a benefit-cost analysis to see if the present dues are appropriate for the benefits received?

4. Is the FFA Organization getting into too many activities peripheral to its major purposes thus increasing its operating expenses and necessitating an increasing dues structure?

Once again, let me thank the authors for the time and efforts they expended in this research effort. Please be assured that I am not trying to diminish the value of this study but simply trying to provoke thought and discussion as to future research directions.

CAREER INDECISION OF SENIOR AGRISCIENCE STUDENTS

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INTRODUCTION

An important task faced by all senior agriscience students is deciding what to do after graduation. For most, choosing an occupation and finding a job will be their immediate task. For others, the challenge will be to enter college and select a field of study. Regardless of the student's potential, agricultural educators should emphasize the importance of this decision.

Few studies have been reported in recent years on the career decisions of agriscience students. Fraze and Briers (1987) found that a relationship existed between participation in FFA activities and choice of career. They also found that students active in FFA enter agricultural professions at a higher rate than the others. Kotrlik and Harrison (1987) found that the vocational agriculture teacher is as influential as the counselor concerning the career decisions of vocational agriculture students and that the vocational agriculture teacher was more influential with vocational agriculture students than other vocational teachers were with students in their programs. Arrington (1985) found that most of Florida's senior vocational agriculture students perceived that their vocational agriculture experiences helped them to choose an occupation.

Hartman et al. (1983) stated that "the popular distinction between being 'career undecided' and 'career indecisive' represents an awareness that career indecision may take either a developmental or a more chronic form. (p. 103)" They challenged the view held by Grites (1981) and Salomone (1982) that chronic indecision should not be addressed until individuals are in their mid-twenties. Crites (1969) defined indecision (or career undecided) as "the inability of the individual to select, or commit himself to a particular course of action which will eventuate in his preparing for and entering a specific occupation" (p. 305). Reasons given for indecision include the person unable to select a career from many choices, the undecided person who can't make a choice from options, and the uninterested person who is uncertain about a choice because of lack of interest.

"In indecision, there may be a lack of information or knowledge of how to sort through options; . . ." (Herr et al., 1988). In contrast, career indecisiveness stems "from general personal problems rather than from doubts related to a specific career choice, perhaps because of the pain involved in decision-making. A " . . . dysfunctional personality . . . may cause such anxiety that an individual is rendered incapable of making a decision" (Herr et al., 1988, p. 427).

Factors related to vocational decisions have been investigated by several researchers. However, no studies of the career indecision levels of agriscience students have been reported. This study examined the career indecision levels of senior agriscience students and studied the factors that may be related to the observed levels of career indecision.

PURPOSE AND OBJECTIVES

The purpose was to determine the career indecision levels of senior agriscience students and to investigate the factors that are related to the career indecision level. The objectives were to:

1. Determine career decision-making attitudes and behaviors of senior agriscience students.

2. Determine the career indecision status of senior agriscience students as measured by the Career Decision Scale (Osipow, 1980).

3. Determine if significant correlations (relationships) exist between selected career decision related factors and the career indecisiveness experienced by senior agriscience students.

4. Determine if selected variables explain significant amounts of the variance in career indecision.

The variables described as selected variables in objectives 3 and 4 are listed in the results section under objective 3.

PROCEDURES

Instrumentation. The Career Decision Scale (CDS) was designed to estimate career indecision of high school and college students and to determine their status in the career decision-making process. The reliability of the CDS is good with test-retest reliability ranging from .70 to .90 (Osipow, 1980). The validity of the CDS is generally accepted as a valid measure of career indecision of high school students. The CDS Manual (Osipow, 1980) presents extensive evidence supporting the validity of the scale.

The demographic and career information section examined factors that have been shown to influence student career decisions. This section was developed after a review of studies of career decision-making influencing factors. The instrument was field tested with 33 students in three high schools and no changes were found to be necessary. The Cronbach's Alpha for the CDS was $\underline{a} = .84$ for the field test data and $\underline{a} = .89$ for the data reported in this study.

Population and Sample. The population included 2,481 senior Agriscience IV students in the state. Using cluster sampling procedures from Scheaffer et al. (1986), a sample was selected that included 277 students in 25 randomly selected agriscience departments. All departments were selected on a random basis and this selection was not conditional on whether they agreed to participate.

Data Collection and Analysis. A packet containing a letter to the agriscience teacher, instructions for administering the questionnaire, and copies of the questionnaire were mailed to the teachers. A follow-up letter and phone call was used to encourage the return of the completed questionnaires. Twenty-three (92.0%) of the teachers responded after two mailings and one phone follow-up. Due to the high response rate, it was determined that additional follow-up procedures were not necessary. Data were collected from 250 students which constitutes 90.3% of the original sample of 277 students. Descriptive statistics were used to analyze the data for objectives one and two. Spearman Rho and Pearson correlations were used to analyze the data for objective three and the conventions used for describing these correlations were defined by Davis (1971). Stepwise multiple regression analysis were used to analyze the data for objective four. The alpha level was set a priori at .05.

RESULTS

Objective 1. The career decision-making characteristics were:

a. Seven percent reported being 'A' students in high school, 27% were 'B' students, 58% were 'C' students, and 9% were 'D' students.

b. Sixty-one percent reported being 'A' students in agriscience, 29% were 'B' students, 19% were 'C' students and 3% were 'D' students. One student reported being an 'F' student in agriscience.

c. Most (76%) lived with parents, 11% with one parent, 7% with a parent and a step-parent, 2% with a spouse, relatives or guardian, and 3% with grandparents.

d. Eight percent reported being an only child, 21% reported two children in the family, 24% reported three children, 21% reported four children, and 25% reported five or more children in the family.

e. Fifty percent of the fathers and 54% of the mothers had a high school diploma, 25% of the fathers and 17% of the mothers did not finish high school, 14% of the fathers and 16% of the mothers had attended vocational school, and 11% of the fathers and 14% of the mothers had a college degree.

f. Thirty-eight percent planned to attend college after graduation and 18% did not know what they wanted to do. Forty-nine percent had been encouraged by their parents to attend college, 43% had been encouraged by their agriscience teacher to attend college, and 46% had been encouraged by their counselor to attend college.

j. Thirty-four percent discussed their career decisions with their counselor, 49% discussed their career decisions with their agriscience teacher, and 89% discussed their career decisions with their parents.

k. Eighty-seven percent were FFA members and 55% had part-time jobs at the time of data collection in April.

Objective 2. The mean CDS score was 33.68 (SD = 10.41). The mean score fell at the 74th percentile which indicates that a fairly high level of career indecision exists. Osipow (1980) indicates that scores which equal or exceed the 85th percentile indicate a serious level of indecision. The responses to the items in the CDS scale are presented in Table 1.

Objective 3. The CDS score had a moderate correlation with whether the student discussed career decisions with the agriscience teacher. The CDS score had a low correlation with age, high school grade point average, agriscience grade point average, father's education level, race, whether students discussed career decisions with the counselor, whether the students discussed career decisions with parents, FFA membership, whether the student had a part-time job, whether the student planned to attend college, and whether the student planned to attend vo-tech or trade school. The CDS score had a negligible correlation with, number of children in the family, mother's education level, sex, whether the student planned to enter the military, and whether the student planned to go to work after high school graduation. These data are presented in Table 2.

Objective 4. Six variables explained 24% of the variance in the CDS score. These variables were whether the students discussed career decisions with the agriscience teacher, race, agriscience grade point average, father's educational level, whether the student planned to attend vo-tech or trade school, and age. These data are presented in Table 3.

CONCLUSIONS AND/OR RECOMMENDATIONS

The results indicate that the CDS scores of senior agriscience students are fairly high when compared with data on other high school seniors presented in the CDS manual. This should be of concern to agricultural educators since they have always felt that one of the strengths of the agriscience program was that it assisted students with their career decisions. Since a moderate correlation exists between whether the agriscience teacher discussed career decisions with the students and the CDS score, teacher educators and state staff should undertake efforts to inservice agriscience teachers on the career development aspects of the agriscience program and encourage teachers to address career decisions with their students. In addition, the career decisiveness of agriscience students should be monitored to ensure that improvement takes place.

The regression analysis revealed that six variables were significant explanatory variables of the CDS score: whether the students discussed career decisions with the agriscience teacher, race, agriscience grade point average, father's educational level, whether the student planned to attend vo-tech or trade school, and age. These variables taken together account for 24% of the variance in the CDS score. Additional research should be conducted to determine other variables that help to explain the variance in the career indecision levels of agriscience students.

The CDS had a low or moderate correlation with 11 variables. In addition, six variables were found to explain a significant proportion of the variance in the CDS score. Teacher educators and state staff should take this information into account as they plan inservice activities and programmatic changes.

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Table 1

Responses to the Career Decision Scale (N = 250)

Statement	M	S.D.
"Adapted and reproduced by special permission of the Publisher, Psychological Assessment Resources, Inc., 16204 North Florida Avenue, Lutz, Florida 33549, from the Career Decision Scale by S. Osipow, C. G. Carney, J. Winer, B. Yanico, M. Koschier, Copyright, 1976, 1987 by Psychological Assessment, Inc. Further reproduction is prohibited without permission from PAR, Inc."		
1. I have decided on a career and feel comfortable with it. I also know how to go about implementing my choice.	2.98	.95
2. I have decided on a major and feel comfortable with it. I also know how to go about implementing my choice.	2.44	1.11
3. If I had the skills or opportunity, I know I would be a ______ but this choice is really not possible for me. I haven't given much consideration to any other alternatives, however.	2.32	1.04
4. Several careers have equal appeal to me. I'm having a difficult time deciding among them.	2.47	1.11
5. I know I will have to go to work eventually, but none of the careers I know about appeal to me.	1.58	.89
6. I'd like to be a ______, but I'm going against the wishes of someone who is important to me if I did so. Because of this, it's difficult for me to make a career decision right now. I hope I can find a way to please them and myself.	1.87	1.12
7. Until now, I haven't given much though to choosing a career. I feel lost when I think about it because I haven't had many experiences in making decisions on my own and I don't have enough information to make a career decision right now.	1.94	1.07
8. I feel discouraged because everything about choosing a career seems so "iffy" and uncertain; I feel discouraged, so much so that I'd like to put off making a decision for the time being.	1.91	1.00

(continued on next page)

Table 1 (continued)

Statement	M	S.D.
9. I thought I new what I wanted for a career, but recently I found out that it wouldn't be possible for me to pursue it. Now I've got to start looking for other possible careers.	1.82	1.02
10. I want to be absolutely certain that my career choice is the "right" one, but none of the careers I know about seem ideal for me.	2.14	1.10
11. Having to make a career decision bothers me. I'd like to make a decision quickly and get it over with. I wish I could take a test that would tell me what kind of career I should pursue.	2.15	1.15
12. I know what I'd like to major in, but I don't know what careers it can lead to that would satisfy me.	2.09	1.09
13. I can't make a career choice right now because I don't know what my abilities are.	1.93	1.08
14. I don't know what my interests are. A few things "turn me on" but I'm not certain that they are related in any way to career possibilities.	2.20	1.12
15. So many things interest me and I know I have the ability to do well regardless of what career I choose. It's hard for me to find just one thing that I would want as a career.	2.71	1.05
16. I have decided on a career, but I'm not certain how to go about implementing my choice. What do I need to become a ______ anyway?	2.09	.99
17. I need more information about what different occupations are like before I can make a career decision.	2.33	1.10
18. I think I know what to major in, but I feel I need some additional support for it as a choice for myself.	2.34	1.09

Note. The CDS scale was as follows: 1 - Exactly like me, 2 - Very much like me, 3 - Only slightly like me, and 4 - Not at all like me.

Table 2

Pearson and Spearman Correlations Between Selected Variables and the Career Indecision Score

Variable	Coefficient	p	Correlation
Whether student discussed career decisions with the agriscience teacher	.30[b]	.001	Moderate
Age	.18[a]	.001	Low
High school grade point average	.21[a]	.001	Low
Agriscience grade point average	.22[a]	.001	Low
Father's education level	-.16[a]	.001	Low
Race	.29[b]	.001	Low
Whether student discussed career decisions with the counselor	.14[b]	.001	Low
Whether student discussed career decisions with parents	.12[b]	.001	Low
FFA membership	.16[b]	.001	Low
Whether the student had a part-time job	.10[b]	.001	Low
Whether student planned to attend college	.15[b]	.001	Low
Whether student planned to attend vo-tech school	.11[b]	.001	Low
Number of children in the family	-.02[a]	.001	Little, if any
Mother's education level	-.01[a]	.001	Little, if any
Sex	-.05[b]	.001	Little, if any
Whether the student planned to enter military	-.05[b]	.001	Little, if any
Whether the student planned to go to work after high school graduation	.08[b]	.001	Little, if any

Note. N = 250

[a]Pearson Correlations; [b]Spearman Rho Correlations.

Table 3

Multiple Regression Analysis of Career Decision Scale Scores (N = 250)

Source of Variation	SS	df	MS	F	Prob. of F
Regression	4888.07	5	977.61	11.91	.0001
Residual	16086.31	196	82.07		
Total	20974.38	201	1059.28		

Variables in the equation

Variables	R^2	Cum. R^2
Whether student discussed career decisions with the agriscience teacher	.115	.115
Race	.049	.164
Agriscience grade point average	.028	.192
Father's educational level	.024	.217
Whether the student planned to attend vo-tech or trade school	.016	.233
Age	.010	.243

CAREER INDECISION OF SENIOR AGRISCIENCE STUDENTS

A Critique

Joe A. Gliem, The Ohio State University -- Discussant

The author needs to be commended for studying a problem that is of great importance to many of our students. His approach to the situation is also unique and offers a different perspective by studying factors related to career indecision rather than career decisions.

I do not intend to spend time looking at the appropriateness of the research design, methodology, nor the statistical analysis of the study. A critique of these items should have been done in the review process and concerns pertaining to these issues should have been grounds for disqualification at that time. Now is not the time to humiliate nor crucify the authors for errors that should have been detected at the onset. Rather, I would like to raise questions and make comments that hopefully will cause one to continue the search for answers in this important area.

With this as background, I would raise the following questions:

1. The author talks about career indecision of agriscience students. Are agriscience students different than traditional agricultural education students? If so, how are they different and what effect does this have on career indecision? Are agriscience students less academically inclined so as not to be able to fill the needs of the agricultural industry thus causing greater career indecision?

2. Are the variables identified in the study appropriate? For the most part, these variables seem to have come from the literature of past studies involving career decisions of agricultural education students. If agriscience students are different, one might question the use of these variables as being suitable. Might we be caught in a vicious circle of trying to explain career indecision with the wrong variables?

3. Is the agriscience curriculum focused upon preparing students for careers or is it the culprit in career indecision because of its general, broad overview of agriculture. Is the curriculum trying to serve too broad and diverse of a population?

Once again, let me thank the author for the time and efforts he has expended in this research effort. Please be assured that I am not trying to diminish the value of this study but simply trying to provoke thought and discussion as to future research directions.

UNDERSTANDING AND TEACHING THE ADULT LEARNER: AN ASSESSMENT OF COOPERATIVE EXTENSION SERVICE FACULTY'S KNOWLEDGE, ATTITUDES, AND BEHAVIOR RELATED TO ADULT EDUCATION

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INTRODUCTION

> "Adult learning is a major, continuing mode of adult behavior permeating the major categories of human experience and the major sectors of society. It takes place in a 'natural setting.' Adult education refers to organized and sequential learning experiences designed to meet the needs of adults. It takes place in the context of 'learning organizations.' To be sure, all adult education then involves adult learning, but all adult learning is not adult education" (Delker, 1974, p. 24).

> "Lifelong learning means self-directed growth. It means understanding yourself and the world. It means acquiring new skills and powers--the only true wealth which you can never lose. It means investment in yourself. Lifelong learning means the joy of discovering how something really works, the delight of becoming aware of some new beauty in the world, the fun of creating something, alone or with other people" (Gross, 1977, p. 16).

By combining these definitions of adult education/lifelong learning, one could postulate that the goal of the Cooperative Extension Service, as one of the world's largest adult education organizations (Prawl, Medlin, & Gross, 1984), could be to:

> "Promote a major, continuing mode of adult behavior aimed at self-directed growth using organized and sequential learning experiences designed to meet the needs of adults. Incorporated into these experiences is the opportunity for adults to understand themselves in relationship to their immediate world as well as to the extended, acquiring new skills and powers to not only function but flourish, The Extension method of adult education recognizes the difference between adult learning and adult education and provides the vehicle with which to link one with the other" (Van Tilburg & Smith, 1989).

Inherent in this newly created goal of the Extension mission is the assumption that Extension educators know and understand how to accomplish this goal; that they possess the knowledge and skills needed to anticipate and recognize adult needs and direct learning activities to adequately address those needs. It is from this assumption, hypothesized by the authors to be inaccurate, that this study's purpose and objectives come.

LOGIC OF ASSUMPTION

Historically, the hiring practices of cooperative extension services in the U.S., and in the case of this study, the Ohio Cooperative Extension Service (OCES), have been to hire individuals who have expertise in a technical subject, most often agricultural or home economics related, rather than education (Prawl, Medlin, & Gross, 1984; Stitzlein, 1990). The indicator of this expertise has traditionally been the pre-professional training or, to be more specific, the college degree(s) held by the potential candidate. Examples of technical degrees would be agronomy, animal science, food science and nutrition, family resource management, and engineering. Examples of 'education' degrees would be home economics education, agricultural education, and adult/continuing education.

The OCES 1989 employment figures illustrate this point. Of the 400 plus county, district and state faculty who were employed as of April 1, 1989, the breakdown of college degrees possessed by OCES faculty related to technical vs. education was as follows (OCES Detailed Employee Record, 3/29/89):

1. For those individuals who held two college degrees:
    - two degrees in education = 99;
    - one degree in education/one degree in technical field = 92;
    - two degrees in technical field = 218.

2. Of those also holding PhD's:
    - 19 had educational degrees;
    - 80 had degrees in a technical field

Given the greater than two to one ratio for technical degreed faculty, the first assumption that can be made is that many OCES faculty currently employed did not receive pre-professional training in adult education strategies. Even though these figures are for the state of Ohio, the authors presume that Ohio extension is not unlike most other states in terms of traditionally hiring faculty with a solid technical base whether or not they also possess educational process skills (Van Tilburg & Smith, 1989).

A second indication that there might have been a lack of knowledge and skills related to adult education was the nature of the inservice offerings presented during the past five years in Ohio. Even though inservice opportunities (optional in nature) have included effective teaching techniques plus other adult learning activities though leadership-type inservices, there has not been an inservice specifically aimed at understanding and teaching the adult learner (Van Tilburg & Smith, 1989).

Given the high probability that many of the OCES faculty were not prepared in adult education strategies but yet, as members of a major adult education organization, were expected to perform as adult educators, this study was designed and implemented as a needs assessment of faculty knowledge, attitudes, and behavior related to adult education. The researchers' goal was that if needs were discovered, an overall approach to addressing these needs could be formulated and implemented.

PURPOSE AND OBJECTIVES

The purpose of this study was to explore and describe the knowledge, attitudes, and behavior related to the principles of adult learning of Ohio Cooperative Extension Service faculty and staff involved in teaching adults. Results from the study were used as a needs assessment to design inservice training for extension faculty and staff. Specific objectives included:

1. Describe knowledge level of faculty and staff related to the principles of adult learning.

2. Describe attitude of faculty and staff related to perceptions of being an adult educator.

3. Describe the extent to which behaviors associated with teaching adults are teacher-centered versus learner-centered.

4. Determine if there are differences among faculty and staff on knowledge, attitude, and behavior, based on selected demographics.

Variables included in the study were the following:

Major Variables: Knowledge of principles of adult learning; attitude toward being an adult educator; behaviors related to teaching adults (teacher vs. learner-centered) as indicated by seven factors -- learner-centered activities, personalizing instruction, relating to experience, assessing student needs, climate building, participation in learning process, and flexibility for personal development (Conti, 1983).

Additional Variables: Program area, professional position, years employed by OCES, highest educational degree, academic major in college, and age.

PROCEDURES

This study was a census survey of 609 OCES tenure-track faculty and administrative and professional staff, all of whom were determined to be involved in some form of delivery of adult education. The data from the study were used as a comprehensive needs assessment, thus the choice to conduct a census rather than sample. Being such, no inferential statistics were employed.

POPULATION

All OCES employees involved in providing some form of adult education were identified as part of the population (N = 609). The frame was obtained from and checked for error by the OCES personnel office. Included in the study were 82 para-professionals involved in Expanded Food and Nutrition Education, 69 para-professionals involved in other adult education programming, 250 county level faculty, 33 district level faculty and administrators, and 175 state level faculty and administrators.

INSTRUMENTATION

The data were collected using a mail questionnaire designed by the researchers following suggestions by Dillman (1978) for format and overall design. The following is a description of the various instruments included in the questionnaire.

- The knowledge scale was a ten item true/false test (scores could range from 0-10 with 10 being a perfect score);
- Attitude was measured using a five-point Likert-type scale (SD = 1, SA = 5) with 15 items (mean scores could range from 1-5 with 5 = most positive);
- Behavior was measured using a self-report scale, "Principles of Adult Learning" (PALS) developed by Conti (1983), containing 44 items scaled 0-5 (never-always). Scores could range from 0-220 such that low scores = teacher-centered behavior, high scores = learner-centered behavior. National norms on PALS are $\bar{x} = 146$, sd = 20. PALS is sub-divided into seven factors (identified in Purpose and Objectives section). Because of the nature of this measure, any individuals with missing data on PALS were eliminated from analysis.
- Demographic variables were measured using appropriate format according to Sudman and Bradburn (1982).

The instrumentation was tested for content validity using a panel of experts (including the author of PALS) and a field test of individuals similar to the population (graduate students in extension/adult education and extension administrators not included in the study population). Reliability was determined during a pilot test using another similar group to the population as described above (n = 15). The Kuder-Richardson 20, for the knowledge test was .72. The Cronbach alpha for the Likert-type attitude scale was .69. PALS has consistently reported acceptable reliabilities (Conti, 1990) for various populations including extension educators.

DATA COLLECTION

Data were collected through the mail during January and February, 1990, again following suggestions by Dillman (1978) related to mail questionnaire administration. After two follow-up mailings to address the non-response indicated by the initial return of 362 (59.4%), a final data sample of 454 usable questionnaires was obtained (final response rate = 74.9%). Comparisons of early and late respondents suggested no differences on major variables in the study. An additional follow-up by telephone of a stratified, 10% sample of non-respondents also indicated no difference. Thus, results were generalized to the initial data sample of 609 (accepting the logic of Miller and Smith, 1983).

ANALYSIS OF DATA

Data were analyzed using SPSS PC+. Descriptive statistics were used to address all four objectives of the study. Because the study was a census, no inferential tests were used; differences in demographic groups were reported as observed. Calculations involving PALS required that individuals with missing data be eliminated from data analysis on the PALS.

RESULTS

Results have been presented by objective with data for Objectives 1-3 appearing in Table 1.

Knowledge of principles of adult learning scores ranged from 2 to 9 (on a scale of 0-10) with the mean score of 5.1 (sd = 1.4; n = 333). Both the median and mode were 5, and with a mean of 5.1, the distribution of scores appeared to model the normal distribution. Note that there were 121 missing cases for this measure; many respondents left answers blank or refused to complete this scale, supporting the cautions made by Sudman and Bradburn (1982) as they addressed problems encountered when measuring knowledge.

Respondents' attitudes toward being an adult educator ranged from 1.8 to 4.5 on a scale with 1 = negative and 5 = positive. The mean score was 3.5 (sd = .32; n = 422), slightly above the neutral scale position. Again, scores appeared to be normally distributed with a mode of 3.4 and the median at 3.5.

The PALS instrument measures self-reports related to teaching behavior such that the larger the score obtained, the more learner-centered are the teaching behaviors. The range of scores was 90 to 176 (out of a possible 0-220). The mean of 133.5 (sd = 14.62; n = 313) and the median and mode of 133 were below the norms on PALS on which the mean is reported to be 146. Scores on the seven factors comprising PALS can be seen in Table 1. Note that on all but one of the factors (#6 - participation in the learning process) the population of this study fell below the norm (indicating more teacher-centered behavior than the "average" adult educator).

Objective 4 sought to determine differences in knowledge, attitude, and behavior based on selected demographics: program area, professional position, years employed by OCES, highest educational degree, academic major in college, and age category. Differences among groups were found but, for practical purposes in interpretation, those differences were minimal (Table 2).

Knowledge mean scores ranged from a low of 4.6 for para-professionals to a high of 5.1 for district/state specialists. Either of these scores can be interpreted to be 'failing' in a typical public school interpretation. Ranges for knowledge scores when the population was divided by other demographics were similar. No grouping indicated greater need for improved knowledge. All members of the population lacked basic knowledge of principles of adult learning. Comparing demographic groups on attitude was similar. Attitude scores ranged from 3.5 to 3.6, slightly positive.

Assessing differences in self-reported teaching behavior for different demographic groupings, the most learner-oriented individuals tended to be district/state administrators; in the home economics program area; employed between 11-15 years by OCES; holding a masters degree in an education area; and between the ages of 41-50 years. The most teacher-oriented individuals were county para-professionals; holding a position out of the four program areas; employed 4-7 years; possessing a high school diploma as their highest degree; and 30 years old or younger. The largest difference on the PALS was for professional position with district/state administrators being most learner-oriented ($\bar{x}$ = 140.3) and county para-professionals being most teacher-oriented ($\bar{x}$ = 129.9).

CONCLUSIONS AND RECOMMENDATIONS

The business of Cooperative Extension Service (CES) personnel is teaching, and most of that teaching is of adults. Trends in hiring have fluctuated from requiring technical degrees with high amounts of technical coursework to seeking out individuals with more diverse educational backgrounds. Regardless of formal training required at the time of hire, individuals 'doing' CES work are 'doing' adult education. Literature suggests that when applied, the principles of adult learning can improve adult students' capacities for learning; but, teachers can only apply these principles if they (1) believe they are adult educators and (2) know and practice adult learning principles. This study was conducted to assess the potential of OCES faculty and staff to be effective adult educators. From the findings, the following conclusions and recommendations can be made.

1. Knowledge of principles of adult learning was low, 50% for most respondents. Additionally, no real differences were found among categories of employees; thus, inservice training aimed at increasing knowledge should be implemented and does not necessarily need to be targeted for specific employees. All were deficient.

2. Attitudes of personnel toward being adult educators were neutral to slightly positive. The organization can send messages, in the form of inservice training opportunities and other teaching supports suggesting the important role that teaching plays in extension work. Good teaching should be acknowledged and rewarded.

3. Extension personnel in this study tended to possess a more teacher-centered behavior pattern than the reported norm for the PALS instrument. Adult learning theory suggests learner-centered behavior to be more desirable in some situations. Individuals should assess their own behavior patterns to see if their approach to teaching adults matches with their belief about how adults learn. The organization should provide inservice opportunities for individuals who wish to become more learner-centered in their approach or who wish to become more effective in their teacher-centered approach.

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Table 1. Descriptive Statistics of Knowledge, Attitude and PALS Scores

Statistic	Knowledge	Attitude	PALS	1	2	3	4	5	6	7
n	333	422	313	348	357	375	382	378	373	371
scale	0-10	1-5	0-220	0-60	0-45	0-30	0-20	0-20	0-20	0-25
k	10	15	44	12	9	6	4	4	4	5
$\bar{x}$	5.1	3.5	133.5	36.4	26.3	20	12.1	14.4	13.2	11.1
sd	1.4	.32	14.6	7.1	4.5	4.6	3.2	2.9	3.2	3.4
range	2-9	1.8-4.5	90-176	11-60	11-40	0-30	0-20	0-20	0-19	1-25
norm $\bar{x}$	N/A	N/A	146	38	31	21	14	16	13	13

1 = Learner-centered activities
2 = Personalizing instruction
3 = Relating to student experiences
4 = Assessing student needs
5 = Climate building
6 = Student participation in learning process
7 = Flexibility for personal development

Table 2. Knowledge, Attitude and PALS Scores Based on Selected Demographics.

Demographic Variables		Attitude			Knowledge			PALS		
		n	$\bar{x}$	sd	n	$\bar{x}$	sd	n	$\bar{x}$	sd
Program Area	Agriculture	123	3.5	0.3	126	4.7	1.4	126	132.0	11.4
	Home Economics	111	3.6	0.3	113	4.9	1.6	113	136.2	15.4
	4-H	115	3.5	0.3	116	4.8	1.6	116	133.3	14.2
	CNRD	24	3.5	0.4	22	5.1	1.4	22	133.5	15.8
	Other	40	3.6	0.3	40	4.8	1.6	20	129.1	17.6
Professional Position	Para-professionals	96	3.6	0.3	101	4.6	1.5	101	129.9	15.0
	County Professionals	201	3.5	0.3	208	4.8	1.5	208	134.9	12.5
	District/State Specialists	79	3.5	0.3	76	5.1	1.6	76	134.5	14.2
	District/State Administrators	17	3.5	0.5	17	5.3	1.3	17	140.3	13.1
Years Employed	≤ 3	127	3.5	0.3	131	4.7	1.5	131	131.7	14.5
	4 - 7	57	3.5	0.3	55	4.3	1.4	55	129.4	15.5
	8 - 15	121	3.5	0.3	121	5.1	1.6	121	136.2	13.3
	> 15	112	3.5	0.3	118	4.8	1.5	118	134.6	13.7
Highest Degree	HS/GED	58	3.6	0.3	59	4.4	1.3	59	129.4	16.8
	BS/BA	73	3.5	0.4	74	4.5	1.4	74	130.6	14.5
	MS/MA	222	3.5	0.3	229	5.1	1.6	229	135.7	13.0
	PhD/EdD	62	3.5	0.3	59	4.7	1.5	59	134.5	14.4
Age Categories	≤ 30 yrs.	65	3.5	0.4	65	4.9	1.2	65	127.9	11.7
	31 - 40	150	3.5	0.3	153	4.9	1.6	153	132.8	14.4
	41 - 50	142	3.6	0.3	146	4.9	1.6	146	136.1	14.3
	> 50	55	3.5	0.3	56	4.3	1.4	56	133.6	14.6
Type of Major for Highest Degree	Technical	162	3.5	0.3	165	4.9	1.5	165	131.9	13.6
	Education	198	3.5	0.3	200	4.9	1.5	200	135.6	13.8

UNDERSTANDING AND TEACHING THE ADULT LEARNER: AN ASSESSMENT OF COOPERATIVE EXTENSION SERVICE FACULTY'S KNOWLEDGE, ATTITUDES, AND BEHAVIOR RELATED TO ADULT EDUCATION

A critique

Ray V. Herren, The University of Georgia

This study dealt with the knowledge, attitudes and behavior related to the principles of adult learning of Ohio Cooperative Extension Service faculty and staff involved in teaching adults. The objectives of the study were certainly worthy of research efforts and were well justified in the introduction. This topic will, I think, be of increasing importance in the decade ahead as the profession deals with agricultural literacy.

From a procedural standpoint the study was sound. The researchers followed accepted guidelines in constructing, validating and field testing the instrument. Reliability for the instrument was somewhat low, but acceptable. Care was also taken to test for differences between early and late respondents and between respondents and non respondents. Data analysis procedures were appropriate for the type of study and population.

I have two areas of concern. First, how valid is a ten item true-false test in determining the knowledge level of those surveyed? The principles of adult learning seems to be a very broad area to be measured by such a test. I question whether or not much insight can be gained into the actual knowledge of the CES faculty and staff regarding the principles of adult learning from the use of such a short and simple exam. Would this exam be sufficient to use as a final in a course on the principles of adult learning? This particular objective of the study will be difficult to complete and should perhaps be an entire study.

Second, the 121 missing cases present a problem. Did these people have no knowledge of adult education? Were they reluctant to take a "non-required exam"? Were they unwilling to take the extra time to complete this section? Since data analysis for this objective used means and the range, logic tells us that these measures would probably be affected by the addition of these missing data.

Given these concerns, I suggest that conclusion number 1 be rewritten to reflect these concerns. The other two conclusions appear to be justified by the findings of the study.

PARTICIPANT MOTIVATION IN OFF-CAMPUS AGRICULTURAL CREDIT PROGRAMS AT IOWA STATE UNIVERSITY

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INTRODUCTION

Off-campus credit programs in the College of Agriculture at Iowa State University were developed in response to a need expressed by agriculturalists. These adults desired credit programs at the undergraduate and graduate levels. The Master of Agriculture degree program was initiated in 1978 and the off-campus Bachelor of Science program started in 1987.

These programs were developed to serve agriculturalists', who are unable to come to the ISU campus, needs for post-secondary education. The success and continuation of these programs is dependent upon participation. Hone (1984) found that the common denominator for success of rural post secondary education programs is to directly address the needs and expectations of the program participants. Christmas (1990) points out a need for identification of factors that motivate adults to participate in agricultural education programs.

Some of the early work on participant motivation in education was done by Houle (1961). Houle presents three motivational types: the "goal-oriented", "activity-oriented", and "learning-oriented".These three types, however, are not pure types and some overlap does exist.

Sheffield (1964) used Houle's typology to construct an instrument to explore participant motivation in adult education activities. His study yielded five distinct orientations: (1) learning, (2) desire-activity, (3) personal-goal, (4) societal-goal, and (5) need-activity.

Boshier (1971) developed the Education Participation Scale (EPS). Houle's Enquiring Mind (1961) and Sheffield's study were used in the development process. Cluster analysis of EPS data was used in a study (Boshier, 1985) to determine if the Houle typology "fitted the phenomenological reality that exists within adult education participants". 13,442 cases were used in the analysis. It was found that Houle's goal and learning orientations were essentially correct. However, the activity orientation was found to be more complex than earlier thought by Houle.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the motivation for participation in off-campus programs. Implications of the specific motivation patterns as related to off-campus programs were identified. The specific objectives of this study were to: 1) Identify the motivational orientations of participants in off-campus agricultural degree programs, and 2) Determine and compare differences in motivational orientations of participants grouped according to selected factors.

PROCEDURES

This study utilized applied descriptive research methodology. Best (1981) described descriptive studies as: (1) non-experimental, dealing with non-manipulated variables, (2) involving hypothesis development and testing, (3) using inductive-deductive reasoning to arrive at generalizations, (4) allowing the use of randomization techniques, and (5) providing information for replication. Gay (1981, p. 12) summarized the purpose of descriptive research as research that "determines and reports the way things are." Applied research studies are best characterized as those which concentrate on educational methodology and structure as they appear in practice (Borg and Gall, 1983). The ultimate goal of applied research is to be of direct utility to practicing educators.

The population of interest were those individuals who participated in the off-campus degree programs in the academic year 1987-88. All persons who completed courses during this time period were included in the sample.

An information sheet was developed by the researcher to collect demographic and situational data. Nine questions were included. The Education Participation Scale (EPS) (Boshier, 1982) was used to determine the motivational orientations of the participants. The EPS is a 40-item scale scored on a four point response framework. The items are broken into six factors with factor reliability estimates ranging from alpha of 0.80 to alpha of 0.88. The six factors are:

1. Social Contact: Reflects a desire to develop or improve one's relationship with other people.
2. Social Stimulation: Reflects a need to find intellectual stimulation as an escape from routine or frustrating situations.
3. Professional Advancement: Reflects a need to improve occupational status or performance.
4. Community Service: Reflects a selfless concern for other people. Many times reflected by a desire to participate in community affairs.
5. External Expectations: Reflects the presence of pressure to participate in educational activities from another person or circumstances.
6. Cognitive Interest: Reflects the view of learning as a way of life and the belief in the concept of learning for the sake of learning.

Appropriateness of use of this instrument for this study was discussed with the author. Additionally, permission was obtained for the EPS' use.

Data were collected using two techniques. Data were collected from participants at an on-campus event held March 26, 1988. Participants were asked to complete the surveys and informed of the voluntary nature and confidentiality of their individual responses. Responses from 122 participants were gathered. A cover letter, survey instrument, and a self-addressed stamped envelope were sent to 75 participants who did not attend the on-campus event. As of April 18, 1988, 38 completed surveys had been returned. A follow-up letter was sent to the nonrespondents. Data collection was completed on May 15, 1988. 55 completed surveys, 73%, were returned from the mailed data collection technique. A total of 177 usable responses were gathered from this sample. This represents an 86% (177 of 205) response rate.

Data were compared by collection technique. No differences attributable to collection technique were found. The Statistical Package for the Social Sciences (SPSSx) was used for data manipulation and analysis. The procedures FREQUENCIES, T-TEST, and ONE-WAY were used.

ANALYSIS OF DATA

PARTICIPANT CHARACTERISTICS

Findings reported in this subsection were generated from the Information Sheet of the instrument packet. Over 60% of the individuals came from towns with populations less than 2500. Most participants were male (91.0%) with the age category mode being 30-34. Most of the participants were married and had children at home (69%). Production agriculturalists made up the largest group of respondents, representing over one-half of the sample, and agribusiness careers accounted for nearly one-fourth of the total group. More than two-thirds of the participants had a Bachelor's degree. Over one-half of the participants were interested in the Master of Agriculture degree and about one-third indicated interest in the Bachelor of Science in Agriculture degree and more than two-fifths of the participants were enrolled in a college credit course within the last year.

PARTICIPATION MOTIVATION

This subsection includes findings derived from the EPS. The research question, 'What are the motivational orientations of persons involved in the off-campus credit programs in agriculture?', was addressed.

The EPS has forty questions cast on a four-point scale. These questions were then factored in a large scale empirical test (Boshier and Collins, 1983). Six factors were identified. They are: (1) social contact, (2) social stimulation, (3) professional advancement, (4) community service, (5) external expectations, and (6) cognitive interest. Scoring of the instrument was done using the guidelines provided by the author of the EPS.

Table 1 details the mean factor ratings and standard deviations of the off-campus program participants (Group 2). "Cognitive interest" was given the highest rating by the sample group with a mean score of 2.88 (standard deviation = 0.82). "Professional advancement" was of next greatest importance with a mean score of 2.58 (standard deviation = 0.53). These two factors were the only factors rated between the descriptors "Little Influence" and "Moderate Influence". "Social contact", "social stimulation", "community service", and "external expectations" had mean ratings of 1.73 1.73, 1.94, and 1.57, relatively. These factors were rated between "No Influence" and "Little Influence".

Table 1. Factor means, standard deviations, and T-values of sample and normative groups.

Factor		Group 1[a] N=12,191	Group 2[b] N=177	T-ratio
Social Contact	M[c]	1.89	1.73	3.58*
	SD[d]	(.78)	(.52)	
Social Stimulation		1.93	1.73	4.96*
		(.75)	(.53)	
Professional Advancement		2.28	2.58	-7.33*
		(.83)	(.53)	
Community Service		2.18	1.94	5.17*
		(.86)	(.62)	
External Expectations		1.72	1.57	3.90*
		(.78)	(.50)	
Cognitve Interest		3.03	2.88	2.82*
		(.82)	(.68)	

[a] Group 1 = normative group
[b] Group 2 = sample group
[c] M = mean
[d] SD = standard deviation

FACTOR SCORES COMPARED TO USER NORMS

Means, standard deviations, and T-values of factor ratings of adult students are presented in Table 1. Group A was comprised of 12,191 adults in enrolled in continuing education programs (Boshier and Collins, 1983). Group B represents the sample of participants in the off-campus programs. The respondents' mean ratings of the factors were significantly lower in five of the six factors; "social contact", "social stimulation", "community service", "external expectations", and "cognitive interest". "Professional advancement" was rated significantly higher than in the overall population. It should be noted that one would expect to find significant differences due to the difference in sample sizes.

SELECTED FACTORS RELATED TO PARTICIPATION MOTIVATION

One-way analysis of variance tests indicated that no significant differences existed among factor ratings when classified by age. T-tests revealed no significant differences among factor ratings when grouped by marital status. T-tests revealed that a significant difference did exist on one factor, external expectations, when grouped by degree status. The two groups were: those persons who had a Bachelors degree and those who did not. Examination of the mean values indicated that persons who possessed a Bachelor's degree were more motivated by "external expectations".

Groups were categorized to reflect the following occupational groups: (1) production agriculture, (2) business, and (3) government service agencies and educators. One-way analysis of variance indicated differences existed in the mean factor rating of three factors; "professional advancement", "external expectations", and "cognitive interest".

Production agriculturalists rated the "professional advancement" factor the lowest (2.431) and government service personnel rated this factor the highest (2.988). An analysis of variance test on the group means indicated that highly significant differences existed among the group means. A Duncan post hoc test revealed a difference at the .05 level in factor rating between the participants who were employed in government service agencies and educators, and those participants in business as well as production agriculturists.

Production agriculturalists had the lowest rating (1.466) and government service agency personnel had the highest (1.962) rating on the "external expectations" factor. A highly significant difference was discovered among these means. A Duncan post hoc test showed differences existed at the .05 level between government service personnel, and production agriculturalists and business people.

Production agriculturalists had the highest mean rating (2.986) and government service personnel had the lowest mean rating (2.609) on the "cognitive interest" factor. Analysis of variance indicates that a difference in the factor means exist. Duncan post hoc test revealed differences at the .05 level in levels of rating between government service personnel, and production agriculturalists and business persons.

Factor ratings were observed when grouped as to the last time enrolled in a college-credit course. The groups were determined, apriori, to be: (1) collegiate experience within the last two years, and (2) collegiate experiences occurring more than two years ago, or no collegiate experience. T-tests revealed no significant differences at the .05 level.

When participants were grouped by program involvement (1) Master of Agriculture (M.Ag.) degree-seeking, (2) Bachelor of Science (B.S.) in Agriculture degree-seeking, and (3) nondegree-seeking, significant differences at the .05 level were observed in three of the six factor rating levels. Differences were observed in the factors "social contact", "social stimulation", and "professional advancement". Using Duncan post-hoc procedure, it was possible to determine which means were statistically different at the .05 level of significance.

The analysis of variance test for differences among means revealed that the factor "social contact" had means of 1.62, 1.85, and 1.51 for persons seeking a B.S., M.Ag., and non-degree seeking persons, respectively. The Duncan procedure indicated that significant differences existed between the M.Ag. and non-degree seekers, and the M.Ag. and B.S. degree-seekers.

Significant differences were found in the "social stimulation" factor. Differences were observed between the M.Ag. and non-degree seekers, and the M.Ag. and B.S. degree-seekers. Non-degree seekers had a significantly lower mean rating of the factor "professional advancement" than persons seeking degrees, B.S. or M.Ag. The means were 2.25, 2.59, and 2.65, respectively.

RESULTS

The following statements summarize the major findings of this investigation.

1. The "cognitive interest" factor mean score was the highest of the six factors.
2. The mean scores of the factors "social contact", "social stimulation", "community service", and "external expectations" were between 1 and 2 ("No Influence" and "Little Influence").
3. Five of six factors means were lower than the mean scores of the normative group. The "professional advancement" factor mean was higher.
4. No differences were found in factor means among age groups of participants.
5. No differences in factor means of married participants and single participants were found.
6. "External expectation" mean factor scores were different in participants who had a Bachelor's degree and those that did not.
7. Production agriculturalists, business people, and persons in government service agencies differed in the mean factor scores of "professional advancement", "external expectations", and "cognitive interest".
8. No differences in factor means of participants with collegiate experience within the two previous years and collegiate experience greater than two years ago were observed.
9. Differences in the "social contact", "social stimulation", and "professional advancement" factors were observed in Master of Agriculture, Bachelor of Science, and non-degree seeking students.

CONCLUSIONS AND RECOMMENDATIONS

Participants in the program were quite homogeneous in that most were married family men from small rural communities who had a common interest in agriculture. Participants were highly educated with the majority possessing a Bachelor's degree. All participants were employed in addition to pursuing additional education. The off-campus programs would be classified as a nonmembership client system based upon geographic, demographic, and to some extent social role criteria (Schroeder, 1980).

Age did not appear to influence the motivation for participation as did not marital status. Motivation due to "external expectations" was noted to be higher among persons who had a Bachelor's degree. The researcher believes this could be attributed to continuing education activities encouraged, or imposed, by employers upon agricultural professionals. Additionally, production agriculturalists who possess a Bachelor's degree have a demonstrated commitment to educational activities.

Above all, participants indicated that the factor "cognitive interest" was the greatest motivator for them to enroll in courses. This indicated that the participants are interested in learning and the belief of learning for the sake of learning in regards to a specific topic or concept.

"Professional advancement" was also highly rated by the participants relative to the other factors. This factor reflects a need to improve occupational status or performance. This factor was rated significantly higher by the off-campus participants than the normative group factor mean. It was interesting to note that all other factor means were found to be significantly lower when compared to the factor means of the normative group. With the exception of "professional advancement", the factors followed trends established by respondents from other adult education programs. The mean levels of the factors were not a concern of the researcher. However the comparison to the normative group may indicate that administrators must pay particular attention to courses which will allow agriculturalists to improve their job status and/or improve performance. In this specific case, the researcher feels that improvement of performance is most important to agriculturalists. This was indicated by the responses of participants to statements within the "professional advancement" factor. This coupled with the motivation provided by the "cognitive interest" factor provides a clear direction for programming decisions. Courses or topics must be of direct interest to students and have direct utility in providing for improved job performance. This is concordant with Polson (1989) in that "ADULTS WANT education to be relevant--dislike wasting time."

Motivation orientations were found to differ among persons in different occupations. Differences existed in the factors; "professional advancement", "external expectations", and "cognitive interest". Persons in the government service organizations and educators are more highly interested in "professional advancement" than others. It is surmised that additional formal education assists in promotion and/or wage increase potential.

Motivation due to "external expectations" was also found to be greater in government service personnel and educators than in other occupations. This could be explained by the encouragement of additional education by superiors. It also seems reasonable that this type of motivation would not be common among production agriculturalist due to their predominant self-employment.

"Cognitive interest" was found to be the highest motivating factor among production agriculturalists. Persons in business also had a mean factor rating higher than that of government service agency personnel and educators. The researcher believes that this is due to the drive for production agriculturalists and business people to increase their competitiveness and performance.

Persons seeking the Master of Agriculture degree were more motivated by social factors than other participants. The factor means of "social contact" and "social stimulation" were higher for Master of Agriculture degree seekers. It is the opinion of the researcher that this could be attributed to the rural settings of these individuals coupled with their commitment to education. The interaction with other agriculturalists would be of major importance to these people.

The mean rating of the "professional advancement" factor was lower among non-degree seeking persons. This may indicate the lack of career advancement possibilities among the participants in the off-campus programs who do not possess at least a Bachelor's degree.

The following recommendations were made by the researcher at the conclusion of the study.

1. Program developers should be aware of the importance of professional development as it impacts upon motivation for participation. Courses should be planned that offer opportunities for agriculturalists to directly improve their job performance.
2. Specifically, government service personnel, as well as agricultural educators, indicate a higher level of motivation attributed to "professional advancement" and "external expectations". Program planning for persons in these occupations should be tailored to specific requirements and/or needs.
3. Persons seeking the Master of Agriculture degree are more socially motivated. Contact between participants, and between participants and instructors should be encouraged. Courses should be developed which allow for a high degree of interaction.

4. "Cognitive interest" as a motivational factor can not be ignored. Courses must be offered which have general broad appeal to agriculturalists.
5. A review of the literature and research did not reveal any studies dealing with the unique respondent group selected in this study. The data reported in this study should therefore serve as basis from which to compare similar respondents in future studies.

The following recommendations are made for further research.

1. A confirmatory study should be conducted to validate the motivational orientations of participants in off-campus post-secondary education programs.
2. Further research should be conducted to identify common programmatic or course characteristics which are related to the factors of motivation to participate.

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PARTICIPANT MOTIVATION IN OFF-CAMPUS AGRICULTURAL CREDIT PROGRAMS AT IOWA STATE UNIVERSITY

A critique

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The purpose of this study was to determine the motivation for participation in off campus college programs. Studies of this nature are of primary importance to the success of programs involving non traditional university enrollees. Knowing what motivates people to enroll and participate is central to the programs, not only in terms of obtaining initial enrollees, but also in terms of how to retain and better serve this population.

To obtain data, the researchers were able to locate an instrument that served their purposes. This allowed the researchers to proceed with the study without having to go through the process of instrument construction, validation and field testing. This is certainly within recommended procedures. The researchers were also thorough enough to discuss the use of the instrument in this particular study with the author of the questionnaire.

I am somewhat unclear as to whether the researchers considered the surveyed group to be a sample or a population. Although it is called both in the paper, I assumed that they intended the group to be a population. If the group is a population, why did the researchers use the T-test and ANOVA? These tests are used for determining the level of confidence at which the researcher can be sure that data from a sample is representative of the population. If a T-test or ANOVA is used to analyze population data, of what use is the analysis if there is no population to which the data may be generalized? Since they have the actual data from the entire population, there is no need for inferential statistics. These tests also have little use as descriptive measures since judgments regarding usable differences can be made using actual population data. I suggest that a comparison of means would be sufficient for data analysis.

Also, I would like to know more about the normative population. From where did the data come? Were these people who were enrolled in agriculture classes or were these people who were enrolled in a variety of programs? Were these students in Iowa, nation wide, or where?

The conclusions and recommendations were well supported by the data and the study should be of use in our "body of knowledge".

SELF-PERCEIVED ORIENTATION TRAINING NEEDS OF EXTENSION PROFESSIONALS IN IOWA

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INTRODUCTION

One of the important problems facing the Cooperative Extension Service is how to determine orientation and in-service training needs of new Extension professionals. The success of educational programs in Extension, just as in teaching, depends heavily upon the abilities of individual professionals (Prawl, 1984).

> "Today's challenge for extension is an expanded educational effort to effectively relate the total expertise and resources of institutions of higher education to the solution of complex problems of individuals and the society in general. This challenge creates a continuous need for staff development for Extension professionals." (ECOP, 1977).

A national staff series of seven modules titled "Working with Our Publics" (Boone, 1988) was developed under the auspices of the Extension Committee on Organization and Policy and was used for the first time in 1988. A needs assessment study would help to match topic areas from these modules with what new staff consider to be important and needed in their orientation. Adult learning theory emphasizes the importance of using the needs of the clientele as a basis for training programs. Lacking comparative information, educators often will impose their own values and perceptions of need. Given the importance of orientation training for improving extension programs, it was necessary that Iowa Extension critically analyze professional training situations and needs and set a course of action to follow. Although numerous studies have been done on extension training needs, both for orientation and for in-service (Wazir, 1985, Brooks, 1982 and Jahi, 1980), changes had taken place in methods, content and materials available for orientation programs and data generalizable to Iowa was lacking.

PURPOSE AND OBJECTIVES

The purpose of the study was to assess orientation needs as perceived by new extension personnel. Specific objectives were: 1) to identify orientation topics and items which needed to be addressed during orientation of extension personnel, 2) to determine the relationships among characteristics of extension personnel and perceived importance and need for training on various topics, and 3) to determine preferred methods for delivering orientation.

METHODS AND PROCEDURES

The population included all new professionals in the Iowa Cooperative Extension Service who were hired within the last five years (1984-1988). The design was an ex post hoc descriptive one. The survey instrument was adapted from questionnaires used in similar studies (Jahi, 1980, and Waziri, 1985). Five major areas and twenty-four items were identified. Respondents indicated their perceptions of need for training on each topic on a five point scale ranging from one (not needed) to five (highly needed). They indicated their perceptions of importance of the topic on a five point scale ranging from one (not important) to five (highly important).

ANALYSIS OF DATA

Reliability of the instrument as measured by Cronbach's Alpha for the importance scale was 0.83, and for the needs scale 0.89. Data were collected from new Cooperative Extension personnel during June and July, 1989. The total population was one hundred eleven. Eight-eight usable questionnaires (79%) were used for the analysis. Early respondents were compared with late respondents on twenty percent of the variables, randomly selected. A t-test indicated no significant differences between the early and late respondents. Therefore, the results were generalized to the population (Miller and Smith, 1983).

Descriptive statistics, freqencies, means, percentages and standard deviations were chosen at the most appropriate for data analysis. Spearman's correlation coefficient (rho) and Kendall's Coefficient of Concordance (W) were used to disclose the degree of agreement among respondents in rankings of orientation training items and the relationships between subjects' demographic characteristics and their perceived orientation needs.

RESULTS

Five major topics and twenty-four orientation items were identified and studied. Respondents indicated their perceptions of need for training on the topic on a five-point scale ranging from one (not needed) to five (highly needed). They indicated their perceptions of importance of the topic on a five-point scale ranging from one (not important) to five (highly important). The mean score of each item within each area for both scales was calculated. Grand means were then calculated for each area. The rank order of the amount of training needed and the perceived importance of the five main areas are presented in Table 1.

Table 1. The rank order of the five main orientation areas according to training needed and importance.

Orientation Training Area	Amount of Training Needed Rank	Amount of Training Needed Mean	Importance Rank	Importance Mean
Human behavior	1	3.570	1	4.358
The Cooperative Extension Service	2	3.511	4	3.868
Program development and evaluation	3	3.505	3	3.916
Facilitating program delivery and learning of clientele	4	3.390	2	4.065
Administration	5	3.384	5	3.736

Spearman correlation coefficient rho=0.60.

Extension professionals ranked the top three areas in terms of amount of training needed: 1) Human behavior, 2) Cooperative Extension and 3) Program development and evaluation. In terms of importance of the areas they were in the following order: 1) Human behavior, 2) Facilitating program delivery and learning of clientele and 3) Program development and evaluation. The degree of agreement on the rankings among the five main areas was 0.60, which indicated a substantial degree of agreement on the rankings.

Table 2 displays the rank order of the twenty-four orientation items according to training needed and importance. Meeting and identifying roles of staff, managing time and resources and motivating clients were highly ranked. The Spearman correlation, rho = 0.74, indicated a substantial degree of agreement between needs and importance among the population studied.

Relationships among four characteristics of respondents and the perceived training needed and importance of orientation items are shown in Table 3. Characteristics included gender, total years in Extension, degree held and academic major. Coefficients of correlation were calculated for both scales, training needed and importance. The degree of agreement on ranking of needs by male and female respondents was rho = 0.3, which is considered low. On the importance scale the degree of agreement between males and females was rho = 0.83, which is considered substantial.

The audience was divided by years in extension: very new, one year, and relatively new, two to five years. The level of agreement between the two groups was at 0.45 on the need scale and at 0.89 on the importance scale. This may indicate that continual needs assessments are necessary as new groups of personnel are ready for orientation.

Table 2 The rank order of 24 orientation items according to training needed and importance[a]

Orientation training area	Amount of training needed		Importance	
	Rank	Mean S.D.	Rank	Mean S.D.
Meet state, area and county staff and identify their roles	1	4.034 1.095	5	4.471 0.745
Manage time and resources	2	3.793 1.090	2	4.598 0.655
Motivate clients	3	3.721 1.155	4	4.512 0.664
Involve committee/volunteers in carrying out and evaluating programs	4	3.636 1.095	13	3.885 1.028
Use appropriate methods to evaluate programs	5	3.625 0.986	11	4.125 0.770
Explain inter-agency cooperation	6	3.557 0.993	12	4.068 0.932
Prepare newsletter, brochure and news articles	7	3.563 1.217	8	4.230 1.042
Identify factors affecting behavior of the people	8	3.552 1.118	7	4.356 0.682
Use interpersonal communication	9	3.547 1.214	1	4.612 0.638
Use computers	10	3.540 1.179	16	3.874 0.986
Complete reports and paperwork	11	3.488 1.103	17	3.644 1.120
Use the major steps in the extension program development process	12	3.448 1.128	13	3.885 0.920

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[a] Scale: 1=low, 5=high; Spearman correlation coefficient rho=0.74.

Table 2. Continued

Orientation training area	Amount of training needed		Importance	
	Rank	Mean S.D.	Rank	Mean S.D.
Select appropriate teaching methods and techniques for each situation	13	3.437 1.158	3	4.545 0.710
Understand myself	13	3.437 1.353	9	4.207 0.954
Develop radio and TV programs	15	3.372 1.218	15	3.674 1.173
Use principles of teaching adults in program delivery	16	3.364 1.074	6	4.409 0.853
Select and develop instructional materials	17	3.318 1.197	10	4.198 0.879
Follow Affirmative Action and civil right guidelines	18	3.310 1.092	18	3.621 1.123
Define relationship of extension to the Land Grant Colleges, USDA and county councils	19	3.284 1.144	21	3.511 0.971
Prepare slides and transparencies	20	3.195 1.189	22	3.483 1.130
Use satellite and video	21	3.184 1.225	20	3.563 1.128
Describe history and mission of the Extension Service	22	3.170 1.074	23	3.420 1.047
Select and supervise aides and staff	23	3.138 1.277	19	3.598 1.298
Prepare budget	24	3.115 1.224	24	3.103 1.294

Table 3. Relationships between selected demographic and perceived training needs.

Demographic Variable	Need Scale	Importance Scale
Gender	0.31*	0.83*
Total Years	0.45*	0.89*
Degree held	0.59**	0.93**
Academic Major	0.49**	0.86**

* Spearman Correlation Coefficient (rho)
** Kendall Coefficient of Concordance (W)

Rankings of respondents were compared according to whether their degree held was a bachelor's, master's or doctoral. There was a substantial relationship on the need scale, (0.93). When respondents were divided by academic major, they seemed to be in higher agreement on the importance scale (W = 0.86), than on the need scale (W = 0.49). Out of eighteen orientation training items, the Extension professionals preferred to obtain information on thirteen of the items from sources/methods other than the on-campus, two-to-three orientation program. Possible other methods would include on-the-job experience, independent studies, interviews, credit courses and training by satellite.

CONCLUSIONS AND RECOMMENDATIONS

1. Orientation training items included in the areas of human behavior and program development and evaluation were highly ranked on both perceived need for training and importance.

2. When the variables, gender, years in Extension, academic degree and major, were considered, the coefficients for perceived needs seemed to be lower than the coefficients for perceived importance.

3. Respondents preferred a variety of sources and methods for orientation training.

RECOMMENDATIONS

According to this study and a review of the literature nationwide there has been a need for the following orientation items:

1. Meeting experienced extension staff, motivation of the clientele, and the teaching/learning process. These items have shown an increased need and importance during recent years and should be addressed more adequately during orientation.

2. Content from the new national materials "Working with Our Publics" (Boone, 1988). A comparison of findings from this study with the national materials would aid in determining the content of orientation programs.

3. Individualized content. A more individualized orientation should be considered. Gender, years in Extension, major and degree should be considered in setting up an individualized orientation.

4. A revised content. The on-campus orientation program should be revised. Extension administrators should make use of the mix of backgrounds and experience and seriously consider other sources/methods such as independent study and satellite/videos.

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SELF PERCEIVED ORIENTATION NEEDS OF EXTENSION PROFESSIONAL IN IOWA

A critique

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This study sought to assess the orientation needs of new extension personnel. This area of study is important to the effectiveness of any educational effort whether it be pre or in service instruction.

The procedures for the study appeared to be sound. The rationale for the study was well developed given the space limitations of the paper. The researchers are to be commended for testing the instrument for validity and reliability even though the instrument was developed from previously tested questionnaires. Any modification has the potential for adversely affecting instrument validity and reliability.

For the most part, data collection procedures were correct. Data from early respondents were compared with data from late respondents and the comparison revealed no differences. However, a follow up sampling of the 21% of the sample who did not respond would have strengthened the study. With this large percent of the sample unaccounted for, questions remain as to how the responses of the non respondents might have affected the data.

I have a few suggestions that might help enhance the study. If the purpose of the study was to determine the orientation needs of new faculty, why survey those who have been employed five years? A person who has been employed for five years would hardly be considered "new". In any case, why should these people would be considered part of the overall group when calculating means. Logic supports the notion that the orientation needs of a person who has been working for five years should be different that those who have less that one years experience. I suspect this is the reason for the high standard deviation in the overall means. Also, I suggest that more information be given concerning such variables as gender and academic major. Apparently the perceived orientation needs of males ranked differently from that of females. How did they differ in the rankings? How did the "majors" differ?

The researchers should also address the relationship of "need" to "importance". Is it possible that the respondents felt that a particular item was "important because there was a "need"? I realize that the reason these issues were not more fully explained was probably because of the space limits on the paper.

MANAGEMENT OF TIME: A KEY TO MANAGERIAL PERFORMANCE

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INTRODUCTION

Cooperative extension is characterized by a multiplicity of programs consisting of individualistic program objectives, educational methods, delivery modes, evaluation techniques and a diversity of client needs and clientele groups. The county extension director (CED) is confronted with an extensive deluge of pressures and demands. Planning, organizing and coordinating educational programs, budgeting to build and maintain program support, as well as accountability, are some of the issues facing CEDs. Furthermore, "managing limited resources to achieve optimum efficiency and effectiveness is perhaps the greatest challenge faced by CEDs in the cooperative extension service" (Whiteside & Batchel, 1987, p.13). These issues and challenges which the CEDs encounter place increased demands on available time.

Ultimately the extent to which CEDs successfully deal with job-related issues and challenges is assessed through their "overall" job performance. Job performance represents the most pervasive outcome variable in micro-organizational research (Staw, 1984). Vroom (1964) provided the basic conceptualization of job performance in the following form:

Job performance = f (ability X motivation)

Subsequently the multiplistic nature of job performance included such variables as abilities, effort, traits and beliefs of the individual and role perceptions and expectations. Job performance, thus reflects a multi-dimensional concept which includes individual and organizational factors. Generally these determinants of job performance have been classified as ability factors, motivational factors and opportunity (variables in the work environment) factors.

Waldman and Spangler (1989) proposed an integrated model of job performance which has application to the examination of CED job performance. In their integrated performance model (Figure 1), three types of variables are identified--namely individual determinants of job performance, contextual work environment determinants and job performance outcome variables. Examination of the model indicated job knowledge and skills, effort, and resources and constraints directly impact job performance. One aspect within the realm of job knowledge and skills is the aspect of time management skills/practices.

Managing time is a universal problem (Fulmer, 1976). Extensive survey results involving persons at all levels in organizations indicate that very few managers have enough time (Moore & Hollis, 1980), and one would suggest that CEDs are no exception. Gonsalez et al. (1984) identified time management as one of the top three competencies required by extension agents in Pennsylvania. Further, in a survey conducted by Penn State Cooperative Extension (1986), a majority of the CEDs identified time management as critically important. Similar findings were reported by Carroll (1989). If CEDs are to cope effectively with the increased demands of their position, they need to develop skills to manage the most critical, scarce and elusive resource, time.

A number of researchers have documented the usefulness of assessing job performance: in determining employee training review and salary administration (Levine, 1986; Rendero, 1980; and Cleveland et al. 1989), in promotion and placement decisions (Campbell et al. 1970), and in providing employee feedback on how they are performing their jobs (Cleveland et al. 1989; and Randell, 1973). However, very few researchers (Noon, 1985; Schriber & Gutek; 1987 and Islam et al. 1987) have studied the relationships between time management and job performance. These researchers concluded that allocation of time across various tasks contributed to enhanced job performance.

How CEDs allocate their time in performing their assigned responsibilities and how they perform on their job are important aspects of management that need to be examined in greater depth. Systematic research in time management and job performance of extension personnel should help in formulating educational programs for enhancing CED managerial effectiveness.

PURPOSE AND OBJECTIVES

The purpose of this study was to examine ways in which Pennsylvania CEDs managed their time, and to analyze relationships between time management and CED job performance. Specific objectives of the study were to:

1. Identify time management practices of CEDs.

2. Determine self perceptions of CED job performance, and

3. Determine relationships between time management practices and CED job performance.

PROCEDURES

This study utilized descriptive survey research. The target population consisted of 64 county extension directors employed in Penn State Cooperative Extension. The frame was obtained from Penn State Cooperative Extension, County/Regional Directory (September, 1989). A random sample of 52 county extension directors was selected to provide a sample at the 95 percent level of confidence and no more than 5 percent sampling error (Krejcie & Morgan, 1970).

Data for this study were collected through a mail questionnaire consisting of three major sections. Section one contained 40 statements that measured five dimensions (work environment, self management, staff supervision, planning and goals, and communications) of self perceived use of time management practices by CEDs. The Executive Time Management Instrument (ETMI) developed by Distasio (1985) was modified and utilized for the study. The items on this instrument were measured on a five-point, Likert-type scale that ranged from "never" (1) to "always" (5). See Chart I for conceptual definitions for the five time management dimensions.

Section two contained 42 statements that measured various aspects of CED job performance. The CED job performance instrument (CEDJPI) developed by the researchers included seven CED job performance dimensions (budget, supervision, leadership, communications, job knowledge, coordination, and programing). The perceptions of CED job performance were measured on a five-point, Likert-type scale that ranged from "strongly disagree" (1) to "strongly agree" (5). See Chart I for conceptual definitions for the seven CED job performance dimensions.

Section three contained statements designed to elicit information on CED demographic characteristics such as age, gender, education level, CED experience, and salary level.

Questionnaire face and content validity was established by using a panel of experts comprising five agricultural and extension education faculty, two administrators in Penn State

Cooperative Extension, one faculty member from Department of Public Administration and a time management specialist. The instrument was pilot tested using 24 CEDs in a neighboring state. The ETMI had an acceptable reliability (Cronbach's alpha=.93). The CEDJPI also had an acceptable reliability (Cronbach's alpha=.96).

After following appropriate follow-up procedures a response rate of 94% was achieved. Because nonrespondents tend to resemble late respondents (Miller & Smith, 1983), CEDs who returned the questionnaire during the first two weeks were compared with those responding during the last two weeks. No significant differences or associations were found between early and late respondents on the key variables included in the study. Data were analyzed using frequencies, percentages, means and correlations.

RESULTS

DEMOGRAPHIC PROFILE OF CEDs

Fifty-three percent of the CEDs responding were in the 51-60 years age category, while 27% of the CEDs were in the 25-45 years age category. Seventy-eight percent of the CEDs were male. Most of the CEDs (65%) had earned a master's degree. Approximately 41% of the CEDs had CED experience of 5-15 years while almost 37% of the CEDs had CED experience of 16 or more years. About 85% of the CEDs reported salary earnings in the range of 30,000 to 49,999 per year.

TIME MANAGEMENT PRACTICES USED BY CEDs

The CEDs were asked to indicate their self perceptions regarding their use of time management practices within the five time management dimensions (work environment, self management, staff supervision, planning and goals, and communications). Results are found in Table 1. The response scale ranged from one to five, with one being "never" and five "always." The mean statement scores for the five time management dimensions ranged from a low of 2.89 (work environment) to a high of 3.81 (communications) indicating that CEDs "sometimes" used the skills of time management. A mean statement score of 3.81 in communications dimension suggests that CEDs "very often" practiced time management skills related to the communications dimension of time management. The mean statement score of 3.23 for the entire time management portion of the survey further illustrates that Pennsylvania CEDs recognized the importance of using effective time management practices.

Table 1. Means and Standard Deviations for Five CED Time Management Dimensions.

Time Management Dimension	n	Mean	S.D.
Work Environment	47	2.89	0.46
Self Management	47	3.02	0.48
Staff Supervision	49	3.03	0.35
Planning and Goals	47	2.98	0.39
Communications	48	3.81	0.42
Total	42	3.23	0.43

Scale: 1=never; 2=rarely; 3=sometimes; 4=very often; and 5=always

SELF PERCEPTIONS OF CED JOB PERFORMANCE

The CEDs were asked to indicate how effective they were in regard to seven CED job performance dimensions (budget, supervision, leadership, communications, job knowledge, coordination and programming.). The data in Table 2 revealed that most CEDs "agreed" or "strongly agreed" with the statements relating to CED job performance. The mean statement score for the seven CED job performance dimensions ranged from a low of 3.52 (supervision dimension) to a high of 4.38 (budget dimension). A mean statement score of 4.38 for the budget dimension indicated that CEDs generally perceived themselves as managing their resources well and operating the budget efficiently. The supervision dimension received the lowest mean statement score (3.52). The mean statement score of 3.93 on the entire CED job performance survey indicates that most CEDs responded with "agree" to the forty-two statements that measured various aspects of CED job performance.

RELATIONSHIPS BETWEEN FIVE TIME MANAGEMENT DIMENSIONS AND TOTAL CED JOB PERFORMANCE

Pearson product-moment correlation coefficients computed to describe the relationships between the five time management dimensions and total CED job performance are presented in Table 3. Data indicated significant relationships between the total CED job performance score and five time management dimensions. A correlation coefficient of .37 for the work environment and .42 for staff supervision indicated moderate relationships with total CED job performance. The correlation coefficients for planning and goals (r=.63), communications (r=.68) and self management (r=.64) dimensions revealed relationships of substantial magnitude. Further, the overall relationship between the total time management value and the total CED job performance value indicated a substantial relationship (r=.64; p<.001).

Table 2. Means and Standard Deviations for Seven CED Job Performance Dimensions.

CED Job Performance Dimension	n	Mean	S.D.
Budget	49	4.38	0.46
Supervision	49	3.52	0.29
Leadership	49	3.66	0.34
Communications	49	4.02	0.48
Job Knowledge	49	4.04	0.44
Coordination	49	4.12	0.53
Programming	49	4.19	0.40
Total	49	3.93	0.28

Scale: 1=strongly disagree; 2=disagree; 3=neutral; 4=agree; and 5= strongly agree

CONCLUSIONS AND RECOMMENDATIONS

The findings of the study indicated that Pennsylvania CEDs appeared to be aware of the importance of time and how to manage it well. Further, it can also be concluded that the CEDs generally exhibited time managing habits and behaviors. These findings were consistent with those of Distasio (1985) for school superintendents in Connecticut.

The Pennsylvania CEDs perceived themselves to perform their CED job responsibilities at a relatively high level. This finding also closely matched the findings of Van Tilburg (1985) for Ohio extension agents. The CEDs perceived themselves to be managing county resources fairly well. However, CEDs appeared to be inadequate, or at least lower, in supervisory and leadership skill areas required for the CED job.

Table 3. Relationships Between Five Time Management Dimensions and Total CED Job Performance.

Time Management Dimensions	n	r
Work Environment	47	.37*
Staff Supervision	49	.42**
Planning and Goals	47	.63**
Communications	48	.68**
Self Management	47	.64**
Total	44	.64**

* $p < .05$ level ** $p < .001$ level

The study found significant relationships between management of time by CEDs and their self perceived job performance. This meant that CEDs who scored high on time management likewise scored high on job performance, suggesting that those CEDs who perceived that they managed time well also perceived themselves to perform better in their CED job responsibilities. Similar findings were reported by Islam et al. (1987) for rural development officers in the Philippines. Further, these findings closely parallel those of Noon (1985) for employees in the private sector and Schriber and Gutek (1987) who reported that efficient and effective scheduling of time in performing various managerial tasks contributed to better managerial performance. It seems most logical to conclude that management of time is one key contributor to managerial performance.

The findings and conclusions provided a basis for the following recommendations.

1. This study has empirically established that management of time is one key to managerial performance. Administrators and staff development personnel in Penn State Cooperative Extension should take note of the findings of this study and commit resources to develop inservice programs in time management to contribute to CED managerial effectiveness.

2. The findings of this study revealed a need for enhancing leadership and supervisory skills of CEDs. Administrators may address this need by developing inservice training programs in supervisory and leaderships skills required for the CED job. The development of such inservice efforts must take into consideration the needs specific to individual CEDs.

3. It is believed that the relative proportion of time the CED spends and devotes to the CED role may influence the perceived and actual performance in that role. In addition, it is believed that the nature of extension programming, the location of the county, and type of clientele might have an impact on the performance of CEDs. It is recommended that further research be conducted to investigate specific contextual factors that influence CED job performance.

4. It is recommended that future researchers examine the leadership styles of CEDs and relationships between leadership styles and CED job performance. The Least-preferred co-worker (LPC) scale which identifies leadership styles on a continuum ranging from 1.00 to 4.00 (task-

oriented style) to 4.01 to 8.00 (relation-oriented style) could be used to determine the leadership styles of CEDs.

5. It is recommended that relationships between perceived and actual time management be examined. That is, we must look more closely as to how people perceive they are managing time and how it is actually managed. This may call for the use of both qualitative and quantitative approaches to research using data sources other than self-reported perceptions.

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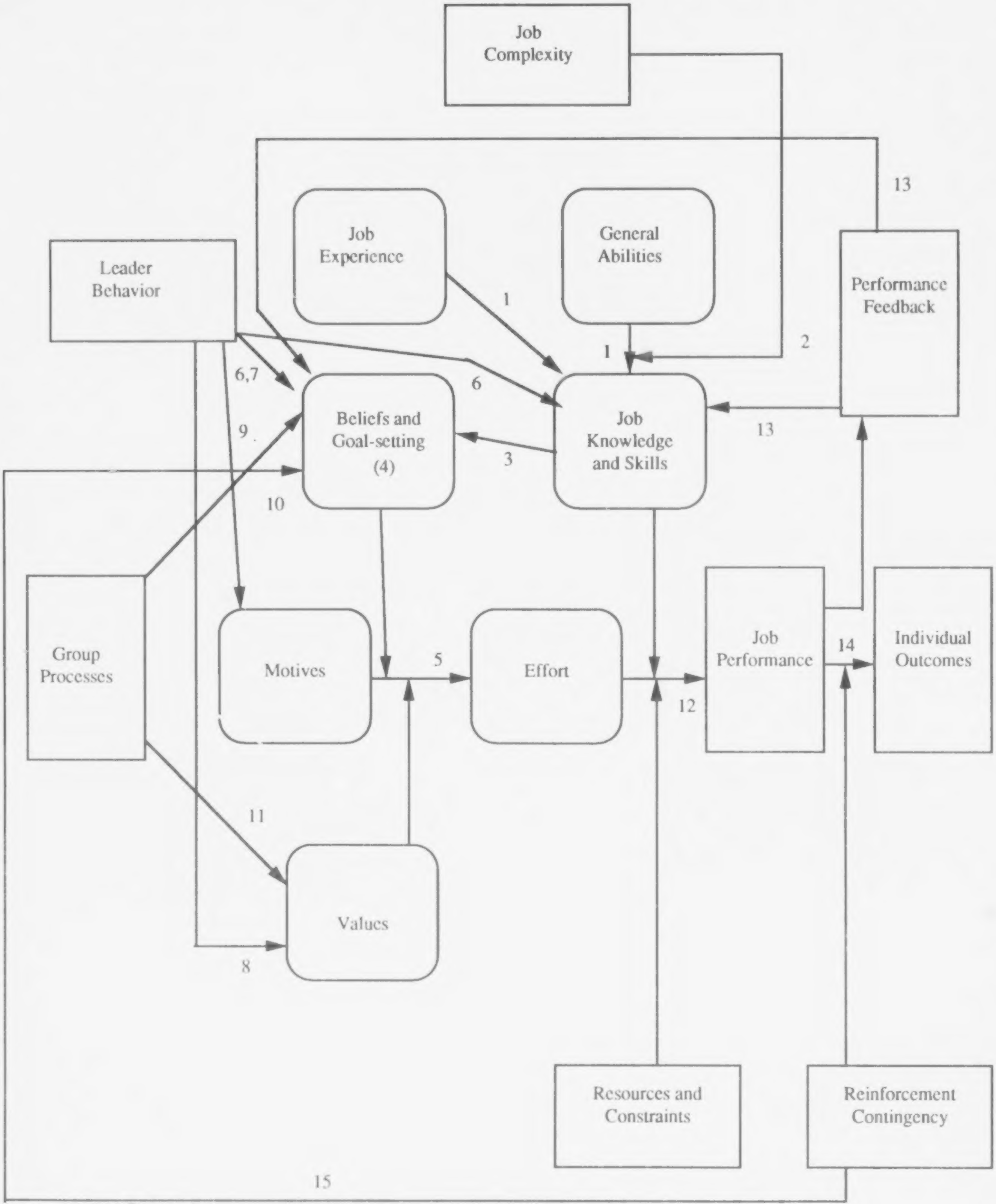
Job Complexity
13
Job Experience
General Abilities
Leader Behavior
Performance Feedback
1
1
2
6,7
6
Beliefs and Goal-setting (4)
Job Knowledge and Skills
9
3
13
10
Group Processes
Motives
5
Effort
Job Performance
14
Individual Outcomes
12
11
Values
8
Resources and Constraints
Reinforcement Contingency
15

FIGURE 1. An Integrated Model of the Determinants of Job Performance.

CHART I

CONCEPTUAL DEFINITIONS FOR FIVE TIME MANAGEMENT AND SEVEN CED JOB PERFORMANCE DIMENSIONS

TIME MANAGEMENT DIMENSIONS

1. **Work Environment**:	Proper equipment, neatness of facility, and organization of items needed for the performance of managerial tasks.
2. **Self Management:**	Self-directed, time saving behaviors, knowledge, and habits developed by managers.
3. **Staff Supervision:**	Ability to supervise, organize, delegate to, and train subordinates.
4. **Planning and Goals:**	Methods used to anticipate future needs, establish goals, consider alternatives, and set priorities.
5. **Communications:**	Methods of exchanging written and oral information that reduce excessive demands on the time of managers.

CED JOB PERFORMANCE DIMENSIONS

1. **Budget:**	Productive use of resources, efficient management of funds, sharing of resources with other agencies and explaining to subordinates why more resources aren't available.
2. **Supervision:**	Ability to organize, delegate and encourage subordinates. Delegation of authority wherever necessary and consulting subordinates in decision making.
3. **Leadership**:	Providing leadership to county extension programs, implementation of program responsibilities etc.
4. **Communications:**	Exchanging written and oral information in a clear, concise and effective manner. Ability to communicate complex information effectively.
5. **Job Knowledge:**	Possessing the subject matter knowledge required to perform CED duties and responsibilities.
6. **Coordination:**	Ability to coordinate with other agencies regarding program priorities, program objectives, working closely with extension boards and sharing staff and other resources.
7. **Programing:**	Establishing program priorities, helping agents in program planning and execution, offering worthwhile suggestions to improve programs.

MANAGEMENT OF TIME: A KEY TO MANAGERIAL PERFORMANCE

A critique

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This paper summarized a study conducted to examine the time management practices of Pennsylvania Cooperative Extension Directors. Time management is a crucial component of any managerial process and is closely tied to job performance. The researchers chose an important and timely topic that deserved study. In the introduction segment of the paper the researchers presented a well thought out rationale for the study. They were careful to follow recommended procedure in the development of the instrument in that they tested the questionnaire for both face and content validity and then pilot tested the instrument. Reliability for the instrument was very high.

I have two concerns about the study. First, why was a sample used instead of surveying the population? Sampling techniques are generally used when the population is not of a manageable size and the researchers are forced to work with smaller numbers that can be generalized back to the entire group. Sixty four people seems to be a small enough population for the researchers to have easily used the entire population; especially since the selected sample was only 12 people less than the population. I suggest that the entire population be used and a telephone follow up of non respondents be made.

Second, can we really rely on the director's perceptions to be a true indication of their time management or job performance skills? For instance can we expect the directors to report that they never used time management on any particular item? Would any of them strongly disagree that they made "productive use of resources"...etc? Also, the area of time management is a broad area. Although generalized definitions of the time management dimensions were given, what actually constitutes the utilization of a practice can vary widely with individuals. In other words, there is quite a difference in using time management practices and effectively using time management practices. These differences could very well have a significant effect on the usability of the data.

ATTITUDES, KNOWLEDGE, AND IMPLEMENTATION OF AGRICULTURAL SCIENCE BY NORTH CAROLINA AGRICULTURAL EDUCATION TEACHERS

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INTRODUCTION

Teaching science related competencies has always been part the agricultural education instructional program. Concepts and principles of chemistry, biology, genetics, physiology, and zoology are readily applied to plant and animal studies emphasized in agricultural education (Moss, 1985). Agriscience is the application of scientific principles and new technologies to agriculture (Cooper, 1990). Agriscience, bioscience, and ag-technology are all buzz words currently being used to reflect the infusion of biotechnology and genetic engineering into the agricultural education curriculum. Biotechnology involves the biology and chemistry of living organisms at the cellular level. Genetic engineering includes techniques of biotechnology which involve the transfer of genes from one organism to another. Both are having major impacts on the agricultural industry, the industry's 21 million plus workers, and the consumers of agriculture in this nation (National Council on Vocational Education, 1990).

The concern for integrating more science and technology into the agricultural curriculum has been spurred by four movements: a) the national back-to-basics emphasis on math and science; b) the national study on agricultural education in the United States which indicated that "the subject matter about agriculture and in agriculture must be broadened" (National Research Council, 1988); c) the expressed need by industry for employees to be able to solve problems and think more critically (National Council on Vocational Education, 1990); and d) the rapid pace by which agriculture is changing as a result of technological advances.

Martin (1989) reported that nationally, agriculture teachers had doubts about student interest in a bioscience program. The instructors were somewhat neutral in their view as to how bioscience diversified career opportunities, related to SAE, or strengthened FFA activities. However, nationally, the instructors supported a need for more instructional materials and expansion of biosciences into the curriculum. They were particularly supportive of expanding instruction with regard to plant growth and development, technology related to animal growth, soil problems and ground water quality, food products and processing. Studying cell biology, structure and function of microorganisms and microbial process in foods was not as attractive to some of the teachers.

Several states have published biotechnology lesson plans and other instructional materials. The appropriateness of the materials and their purpose is well stated by Burdette, Michael, & Lawrence (1989): "Intent of the lessons is not to make "biotechnologists" out of secondary agriculture students, but rather to provide them with sufficient information and understanding that they can become intelligent and discriminating consumers of products and processes developed through biotechnology -- in other words, to induce biotechnology literacy into our next generation of agriculturalists".

Agricultural education is revitalizing its programs through agriscience and technology. Luft & Peterson (1989) as well as Kirby, Smith, Wilson, & Matheson (1990) attributed increased enrollment and student interest in agriculture to a program emphasis on agriscience. In North Carolina, enrollment in one agriculture program doubled within a two year period after shifting the emphasis of study to agriculture science.

Besides teaching about biotechnology in the high school classroom, what other role does the teacher play in the diffusion of information about agriscience and the new technologies? Currently, the public learns about biotechnology through mass media rather than through workshops or continuing education. In North Carolina, the public believes that genetic engineering is desirable. However, they are more supportive of biotechnology efforts which improve health or plants rather than genetic engineering with animals (Hoban, 1989).

Agricultural educators in North Carolina are faced with the challenge of teaching about rapidly developing technologies in agriculture. Teachers and students encounter ethical as well as knowledge based problems as they work together to prepare leaders for the agricultural industry. So that educational programs might be delivered, it is important to assess North Carolina agricultural teachers' attitudes, knowledge, and strategies for using agricultural science as the subject of study.

PURPOSE AND OBJECTIVES

The purpose of the study was to describe North Carolina agricultural teachers' attitudes toward and knowledge level of agricultural science as well as activities which demonstrate implementation of agricultural science. A secondary purpose was to determine if there was a relationship between selected demographic teacher variables and agricultural science attitudes and knowledge levels. As a result of the study, the following research questions were answered:

1. What are the attitudes of North Carolina Agricultural teachers toward biotechnology, genetic engineering, and agriscience ?
2. What level of knowledge and understanding is demonstrated by North Carolina Agricultural Education teachers regarding biotechnology, genetic engineering, and agriscience ?
3. What is the role of the agricultural education teacher with regard to Biotechnology ?
4. What barriers do agricultural education teachers face when they teach agriscience, biotechnology, and genetic engineering concepts and problems ?
5. What relationships exist between selected teacher demographic variables and biotechnology attitudes and knowledge levels ?

PROCEDURES

Design

Survey research design with a correlational component was used for the study. The design is appropriate for describing the characteristics of the study population and for exploring possible relationships between characteristics and behaviors.

The Population

The population for the study included 355 vocational agriculture teachers in North Carolina. The population frame was established from the 1989 - 1990 North Carolina Agricultural Education Directory and verified by Agricultural Education consultants in the North Carolina Department of Public Instruction. A random sample of 186 teachers was selected for the study population based on Krejcie and Morgan's formula (1970).

Instrumentation

The Agricultural Education survey instrument was the fifth data collection instrument developed as a parallel instrument to be part of a series which included the following: Agricultural Biotechnology in North Carolina , Personnel Needs of North Carolina's Biotechnology companies, Personnel Needs of North Carolina's University and Hospital Research, and Agricultural Leaders Personal Survey (1989). The instrument was used to collect data from agricultural teachers and was developed in cooperation with the North Carolina Biotechnology Center and the North Carolina Extension Service.

Part I of the instrument elicited demographic and general information about technology. Part II focused on determining genetic engineering attitudes and knowledge while Part III posed similar questions about biotechnology. Part IV included items which assessed teacher perceptions of student attitudes, instructional materials, instructional constraints for infusing genetic engineering and biotechnology in the curriculum.

Student abilities to solve agricultural problems are of major concern to all the agencies involved. Teaching agriscience, biotechnology, genetic engineering content requires the use of higher order thinking skills and problem solving techniques. The last section of the instrument elicited information about strategies used in teaching agricultural problems. It was adapted from a dissertation study conducted by Pongpan Chuatong, Factors Associated with the Problem Solving Ability of High School Students Enrolled in Vocational Horticulture (1986). Content validity for the instrument was established by panel of agricultural education experts. The coefficient of stability, Cronbach's alpha, as a measure of reliability, ranged from .72 to .83 on sections of scaled items. Results from this portion of the study is not being reported in this paper.

The Biotechnology in North Carolina's Agricultural Education Programs survey was validate by a panel of experts and the project advisory committee which included personnel from the Biotechnology Center, the Extension Service, agricultural education state staff, and the National Agriscience Teacher of the Year. After two revisions, the instrument was field tested by 15 agricultural education teachers who were not included in the survey. The teachers completed the survey and reported any ambiguities. for a final revision.

Data Collection

A questionnaire booklet with cover letter was mailed to each of the 186 randomly selected teachers. Two weeks later, a reminder postcard was sent to nonrespondents. Five weeks after the initial mailing, a second instrument was sent and a request to complete it if the first one had been lost or for some other reason not completed and mailed. A total of 162 instruments were returned, achieving a 87% response rate. Late respondents are similar to nonrespondents (Miller and Smith, 1983). Since a comparison of late and early responded revealed no differences, no other follow-up procedures were used.

DATA ANALYSIS

Descriptive statistics were reported such as frequencies, percents, and measures of central tendency to describe the study population. Pearson's product-moment correlation coefficient was used to determine if there were any relationships between selected demographic variables and attitudes or knowledge level. Davis conventions were used to interpret and discuss the practical significance of the coefficients. The alpha level was set at .05. Midpoints were used to interpret Likert-type scaled items.

RESULTS

Demographic Characteristics

On the average, the teachers taught agricultural education for 14 years. Almost 75% teach Introduction to Agriculture and Natural Resources, followed by 51% who teach Horticulture, 40% who teach Agricultural Production and Management, 27% teach Agricultural Engineering and Technology, 19% teach Forestry and Natural Resources, and 28% teach other courses including Homestead and Gardening, Ag in Our Lives, and modified courses.

The greatest percentage of the teacher (51.23%) have earned Bachelor degrees while 48.15% have masters degrees. Less than 1% hold six year certificates. It was interesting that 43% of the teachers owned or operated a farm and 16% owned or operated an agribusiness. Negligible relationships existed between these demographic characteristics and biotech or genetic engineering awareness.

Attitudes Toward and Knowledge about Biotechnology and Genetic Engineering

On a scale of 1 to 4 , with 1 being none and 4 being a lot, teachers have read or heard some about genetic engineering (*M* = 3.06, SD = .62)and biotechnology (*M* = 2.82, SD = .61). Most of the teachers read or have heard something about pest-resistant plants, herbicide-resistant plants, and Bovine somatotropin (BST). Over 99% did not believe that cross breeding to produce hybrids or that genetic engineering of plants is morally wrong. Genetic engineering of animals is supported by 96%. Eighty-six percent of the teachers would support field tests of genetically engineered bacteria in their communities if it were designed to protect plants from frost damage. In their opinion, genetic engineering is desirable to very desirable when the technology improves plants, the environment, animals, human health, and food.

Teachers have a moderate amount of awareness and understanding of biotechnology products or processes, the basic science underlying biotechnology, the benefits and risks, and social issues and public concerns (*M* = 2.82,where 1 means no awareness and 4 means full awareness). On the average, teachers have participated in 1 biotechnology workshop. Although the relationship was statistically significant, a low, positive association existed between numbers of workshop and teachers' awareness of biotechnology (*r* = .21). Eighty to 90% support government regulations of genetic engineering to protect public health risks, damage to the environment, economic hardships, and social impact on communities.

Teachers obtained most of their knowledge about new technology by reading current magazines, journals, and materials from the extension service. They indicated that they would trust the extension service the most in deciding whether or not to use a new technology and in learning how to use the technology as opposed to trusting product manufacturers or commodity groups.

Teaching Agriscience and Infusing Biotechnology and Genetic Engineering in the Curriculum

Table 1
Level of Teacher and Student Awareness and Understanding of Biotechnology as Perceived by Teachers

Biotechnology Concepts	Teacher Knowledge		Student Knowledge	
	M	SD	M	SD
1. Biotechnology products or processes	2.76	.85	2.04	.77
2. Basic science underlying biotechnology	2.91	.93	1.98	.80
3. Benefits and risks	2.77	.90	2.01	.85
4. Societal issues and public concerns	2.84	.84	1.98	.88

Note. Scale ranged from 1 = no awareness, 2, 3 = some awareness, 4, 5 = full awareness. Midpoints were used for interpretation.

On a scale ranging from 1 to 5 with 1 being no awareness to 5 being full awareness, teachers perceived their students as having a low level of awareness and understanding of biotechnology products or processes, the basic science underlying biotechnology, the benefits and risks, and social issues and public concerns (Table 1). However, they believed that agricultural education students needed to learn about biotechnology and rated the ag student's need to learn as higher than college bound students, noncollege bound students, 4-H members, and consumers.

Teachers believed that biotechnology would effect their job, especially in terms of their teaching responsibilities. As a general term, agriscience means teaching the scientific principles of agriculture as compared to biotechnology being a more specific science. The Table 2 displays the extent to which teachers perceived barriers to teaching agriscience and biotechnology/genetic engineering. Barriers to teaching biotechnology are slightly greater than teaching general agriscience. Equipment, instructional materials, and textbooks are the leading barriers.

Table 2
Mean Scores Reflecting the Extent to Which There are Barriers in Teaching Agriscience and Biotechnology/Genetic Engineering.

Barriers Agriscience	Biotechnology			
	M	SD	M	SD
Equipment	4.15	1.10	4.25	1.00
Instructional Materials	4.11	1.05	4.26	1.04
Textbooks	3.92	1.08	4.11	1.08
Student Academic Ability	3.56	1.13	3.63	1.20
Teacher Knowledge	3.41	1.04	3.77	1.04
Time	3.17	1.11	3.36	1.14

Note: the Scale: 1 = small extent, 2 , 3 = some extent, 4, 5 = a large extent. Midpoint ranges were used for interpretation.

To some extent, teachers perceived developing educational materials, programs, and teaching about new technology as part of their job. On a scale of one to four, with one being "not at all" and 4 being "to a large extent", teachers believed that to some extent, it was their job to be involved in biotechnology to following ways: a) teaching high school students about biotechnology, M = 3.36; developing instructional materials and lesson plans, M = 3.02; c) educating farmers/agriculturalists, M = 2.98; d) educating public policy makers about biotechnology, M = 2.88; e) distributing publications about biotechnology, M = 2.82; f) educating consumers about biotechnology, M = 2.81; and g) sponsoring meeting related to biotechnology, M = 2.62. Teachers do not perceive their jobs to include biotechnology research or developing publications.

Agriscience Activities and Projects

Teachers have incorporated agriscience projects, some of an experimental nature to assist students in developing thinking and science skills. Table 3 displays major agriscience activities, including biotechnology activities, that are being conducted by 38 teachers (23%). These activities represent the infusion of biotechnology concepts even though some are rather traditional, like water and soil studies, to the vocational agriculture instructional program.

To successfully integrate agriscience/biotechnology activities, teachers need resources to help them learn more so that they can teach about technology. Teachers requested workshops followed by video tapes, slide sets, then university courses as very effective to less effective ways to inform them about biotechnology (see Table 4).

CONCLUSIONS

Given the findings of this study, the following conclusions were drawn:

1. Teachers in North Carolina are positive in their attitudes toward the use of biotechnology and genetic engineering.
2. A moderate level of knowledge exists among teachers about biotechnology and genetic engineering.

3. Teacher perceive themselves as playing an active role in developing teaching materials, programs, and delivering instruction about biotechnology and genetic engineering.
4. Time, teacher ability, nor student ability are as great as barriers to teaching agriscience and biotechnology as are equipment, instructional materials, and textbooks.
5. Teachers are just beginning to conduct major agriscience/ biotechnology projects as only 23% had projects to report.
6. Teachers have had few opportunities to participate in workshops, yet they perceive workshops as the most effective means of learning about biotechnology. Workshops have a positive relationship to biotechnology interest and knowledge levels.

Table 3
Major Agriscience/Biotechnology Projects Conducted by Vocational Agriculture Programs

AGRISCIENCE/BIOTECHNOLOGY PROJECTS	FREQUENCY
1. Experiment with NASA tomato seeds that were in space for six years.	13
2. Manipulate growth of poinsettias by altering nutrient uptake	3
3. Study the rate of microbial growth in a decomposition chamber under varying sets of circumstances.	1
4. Isolation of fungi	1
5. Effect of environmental and chemical factors on plant growth.	7
6. Test the different amount of fertilizer on plant growth.	1
7. Conduct plant research: nutrition, pests/pesticides, light, moisture, soils	1
8 Conduct a project to regulate growth by using temperature to regulate cell size rather than using Alar or B-Nine.	1
9. Experiment with plants in science class	1
10. Participate in field trips to NCSU and Robeson County,	1
11. Observe and hatch chicks	1
12. Use the microscope to learn more about insect and plant parts.	1
13. Use the microcomputer in learning Autocad/Landcad in horticulture	1
14. Water quality testing for CO_2, O_2, NO_3, P_2O_5, and pH;	4
15. Conduct water pollution project with grant from Southern Bell	1
18. Water treatment	1
19. Conduct soil testing and analysis	3
20. Study soil and effects on nutrient availability	1
21. View Agriscience and Biotechnology films, videos, and other visual materials.	6
22. Collect data and related news articles on biotechnology to our studies.	1
23. Work with hydroponics in the greenhouse and classroom.	3
24. Conduct tissue culture projects.	7
25. Use tissue culture: African Violet culture in test tube, micro-propagation	1
26. Develop a model program for North Carolina- Modifying existing courses to include more science and up to date topics.	1
27. Set up "Earth Day" displays at school.	1
28 Explain basic functions of DNA and how it can be changed, manipulated, or produced in the animal and plant sciences.	1
29. Conduct acid rain research on pine trees which resulted in first place in the state AgriScience 1989 award program, \$1,000.00 scholarship; The 3 year study is now complete.	1

Note. 38 teachers reporting.

RECOMMENDATIONS

Teachers are positive and receptive to learning about biotechnology and genetic engineering. They have indicated that there is a need to teach new technological information in the agricultural classroom. If the instruction is to take place in a systematic manner, the state leadership needs to assist teachers by providing adequate resources including equipment, visual and written instructional materials, and additional workshops. The workshops need to focus on teaching technical information as well as instructional methods, such as problem solving, that lend themselves to developing student thinking skills in science. Further research needs to be conducted which focuses on the effectiveness of the agriscience instruction.

Table 4
Perceived Effectiveness of Various Educational Resources on Agriscience, Biotechnology, and Genetic Engineering

Instructional Mode	M	SD
Workshops	4.44	0.99
Video tapes	4.36	0.98
Slide sets/movies	4.12	1.07
University courses	4.03	1.15
Lesson Plans	3.98	1.08
Textbooks	3.82	1.05
Computer programs	3.78	1.12

Note. Scale: 1 = very ineffective, 2, 3 = somewhat effective, 4, 5 = very effective. Midpoints were used to interpret the scale.

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ATTITUDES, KNOWLEDGE, AND IMPLEMENTATION OF AGRICULTURAL SCIENCE BY NORTH CAROLINA AGRICULTURAL EDUCATION TEACHERS

A Critique

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Agriscience, bioscience, and ag-technology are so frequently used in discussions regarding the updating of agricultural education programs that perhaps they are the current "buzz words" for curriculum change in agricultural education. I believe the terms mean different things to different people and the researcher is to be commended for investigating what agriscience, biotechnology, etc. means to North Carolina agricultural education teachers. If teachers are going to incorporate more agriscience into their programs it is important to know their attitudes, knowledge, and understanding of the subject.

The introduction to the study adequately describes and defines the terminology of agriscience and establishes a rationale for the research. Of particular interest is the research reviewed on the revitalizing of agricultural education programs through agriscience and technology. The objectives, procedures, and data analysis are appropriate for the purpose of the research which was one component of a larger five-part study.

The results of the study (teachers are moderately aware of biotechnology) parallel other research findings on the topic. One interesting finding was that the teachers rated the "ag students need to learn [about biotechnology] as higher than college bound students, noncollege bound students, 4-H members, and consumers". I would tend to disagree with the perception and ask the question, why do they feel that way? The data collected on barriers to teaching agriscience and biotechnology/genetic engineering provides concrete information for state planning efforts which can reduce the barriers. Perhaps, we too often lay the blame for slow change on the attitudes of our teachers when other factors such as necessary equipment may be the culprit.

The conclusions and recommendations are appropriate to the findings of the study. It will be interesting to watch what takes place now in North Carolina as a follow-up to this research. What needs to be done and in what manner has been identified. Good luck in doing it.

A NURSERY/LANDSCAPE PROGRAM IN AGRICULTURAL EDUCATION FOR THE NEW MILLENNIUM: A FUTURES STUDY UTILIZING THE DELPHI TECHNIQUE

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INTRODUCTION

An important task for educators is to develop programs which take into account changes that will have occurred in the subject area by the time a student begins work or that will occur over the working life of the student. Curriculum planning, by its nature, is a prediction of the future. Curriculum being planned today will be applied by workers 4 to 6 years in the future, considering 1-2 years in development and 2-4 years of study by a high school student. Ravitch (1983) stated that all educators, especially program planners, must be involved in futuristic thinking.

In the past, planning for future needs was a relatively straightforward process because, generally, it could be assumed that the future would be much like the present. A traditional model has been to survey incumbent workers to determine what tasks they perform on the job -- never accounting for the changes that will occur before the curriculum is even in place (Dede and Allen, 1981). However, experts now agree that planning should be based on a futuristic model (Ravitch, 1983; Cornish, 1987; Murphy, 1987).

The Delphi technique has been used in government, industry, medicine, regional planning, and education over a variety of situations including futures forecasting, curriculum planning, program planning, policy formation and problem identification and solutions (Uhl, 1983). Finch and Crunkilton (1984) identified the Delphi technique as one of six strategies for determining curriculum content.

The nursery/landscaping business is expanding rapidly across America, yet little research is available that projects future growth or the related employment and training needs of the industry. This study utilized the Delphi technique for determining future characteristics of the nursery/landscape industry, from which to recommend curriculum development in Agricultural Education.

PURPOSE AND OBJECTIVES

The purpose of this research was to determine the characteristics of the nursery/landscape industry in the year 2000 in order to recommend content for agricultural education programs of the future.

Specific objectives were to determine:

1. if the Delphi technique could be used to achieve consensus among nursery/landscape experts concerning the future of the industry;
2. a demographic profile of opinion leaders in the nursery/landscape industry;
3. the characteristics of the nursery/landscape industry in the year 2000; and
4. the educational and work force needs of the nursery/landscape industry in the year 2000.

PROCEDURES

This was a national futures study (a type of descriptive research) utilizing a modified (two-round) Delphi technique. Collection of data consisted of four phases: instrument development, selection of a panel of experts, an initial round, and a final round of the Delphi.

A structured Delphi instrument consisting of 57 items on a five point Likert-type scale was developed from nursery/landscape literature dealing with predictions of future directions of the industry. Over 300 statements were gleaned from 88 journal and professional magazine articles and research reports. A draft of the instrument was reviewed by a panel of 17 persons who had expertise in the nursery/landscape field, in futures research, and/or in education. The panel evaluated the items for importance and reviewed the instrument for content and face validity. Because of the small N it was not possible to perform a test for reliability.

The top 29 professionals in the nursery/landscape field nationwide were selected to participate through a national nomination process utilizing 66 nominators. Nominators were executive secretaries from state nursery/landscape associations and officials of the American Association of Nurserymen (AAN). Three hundred and ten nominations were received -- a 97% response rate. Twenty-nine of the 30 most frequently nominated experts agreed to serve on the panel; four respondents replied too late to be included.

ANALYSIS OF DATA

Statistics used for analysis of data included count, composite score, means, percentages, medians, standard deviations, interquartile ranges, Pearson product-moment correlation coefficients, and the Wilcoxon matched-pairs-signed-ranks test. Stability of responses between rounds, group agreement, and item ranking were determined using these statistics.

RESULTS

When asked to list their primary activity in nursery/landscape, 16 or 64% of the 25 members of the panel of experts marked the wholesaler category. All 25 experts were in commercial nursery/landscape businesses. No respondent listed researcher, author, teacher, Extension specialist/agent, or broker as a primary nursery/landscape related activity. The 25 experts participating in the study were all males and well educated. The group had a total of 784 years with a mean of 31.5 years of experience in nursery/landscape work. Respondents ranged in age from 33 to 69 years of age, and all listed their position as being in the management and/or owner category. In interpreting the results of the Delphi, a description of experts is not important and should never be a basis for interpretation. However, this information can be important in selection of groups for further study.

The small change in standard deviation and interquartile ranges from round one to round two indicated that the group answers had reached consensus. As measured by standard deviation, 92 percent of the items moved toward the mean; and, as measured by the interquartile ranges, 93 percent of the items moved toward the median. The responses were found to be stable (not significantly changed from round one to round two) in 56 or 98% of the items as indicated by the Pearson product-moment correlation coefficient procedure and in 52 (91%) of the items as measured with the Wilcoxon matched-pairs signed-ranks test.

Consensus was indicated on an item if (a) at least 60% of the respondents were in agreement and (b) the composite score was less than 62.5 or greater than 87.5 -- that is, the composite score fell into either the agree or disagree range (Hill & Fowles, 1975). Fifteen items (26%) did not meet both consensus criteria. Of the 42 items on which consensus was reached, five (12%) were in the "disagree" range of the scale and 37 (88%) were in the "agree" range. The composite score was used to rank the items in order of agreement. The highest-ranked items concerned the need for computers and expertise in business management and marketing. The lowest-ranked items dealt with marketing strategies and government assistance. Those findings are presented in Table 1. Respondents made a total of 541 explanatory comments -- 308 in round one and 233 in round two.

CONCLUSIONS AND RECOMMENDATIONS

It was concluded that:

1. The Delphi technique was effective in determining consensus among nursery/landscape experts regarding future characteristics of the industry; program focus for the year 2000 could be recommended based on the consensus of experts. Two rounds are adequate in a Delphi study when a structured instrument is utilized.
2. Opinion leaders in the nursery/landscape industry were business leaders, primarily involved in wholesaling. Opinion leaders in industry can best determine content for nursery/landscape programs of the future.
3. The nursery/landscape industry will grow and change rapidly into the 21st century.
4. There will be increased employment opportunities and a corresponding need for training programs in nursery/landscape.

Thirty essential content areas are recommended for inclusion in Agricultural Education in order to prepare workers for the nursery/landscape industry of the 21st century. They are listed in Figure 1. Nursery/landscape course work in Agricultural Education should be emphasized and expanded. Preservice programs should include nursery/landscape courses. Inservice workshops for teachers should utilize nursery/landscape personnel and trade organizations.

Major changes in the curriculum for nursery/landscape instruction are needed. Teachers will need more help in keeping up-to-date on content. The nursery/landscape industry will need assistance with the education of their employees in the future. Vocational-Technical educators can have a decisive role in the future of the industry if forward looking curriculum, faculty and facilities are utilized.

Table 1
Items of Highest and Lowest Rank by Composite Score

Number	Item	Composite Score	Rank Order
Highest Ranked Items			
4.	Computers will play a major role in all aspects of the nursery/landscape business	117	1
17.	Expertise in business management and marketing will be more important for survival than production techniques	112	2
19.	Leadership and problem solving skills will have increased importance in the nursery/landscape industry	110	3
21.	The demand will be greater for well trained, professional workers with good communications and personal relations skills	109	4
46.	Customer education through clinics, point-of-sale videos, information sheets, and spoken communications will increase in the retail nursery industry	107	5
57.	Water conserving irrigation techniques will be required by a combination of government regulations, costs and availability of water	107	6
56.	Fertilization methods will be altered to meet government standards for ground water protection	106	7
15.	Participation in nurserymen/landscape(r) certification programs will increase	106	8
45.	There will be more national advertising and promotional campaigns by industry organizations	106	9
20.	Increased emphasis on salesmanship skills will be included in training programs	105	10
Lowest Ranked Items			
10.	The number of family owned and independently owned businesses will decrease as corporate owned nursery/landscape businesses become most common	73	48
36.	Retail nursery/landscape companies will establish more, smaller outlets rather than a few large stores	72	49
42.	A system, such as the crop reporting service, will be developed to measure the production and/or consumption of nursery crops	71	50
51.	The necessity for expensive equipment will prohibit easy entry into a nursery or landscape business	67	51
9.	Large companies (non-nursery/landscape) will operate their own nurseries and maintain in-house landscape crews	66	52
43.	A nation wide electronic marketing/clearing house system for buying and selling plants will be a major method of marketing	54	53
40.	Wholesale distributors controlling the middle position of the market will expand to control the growing and retail ends of the industry	51	54
35.	Production and inventory control will be based on supply and demand data supplied by a national crop reporting system	50	55
38.	Plant auctions (similar to the Holland Flower Auctions) will be common	47	56
5.	Government assistance/services/research will increase	46	57

Business management skills
Mathematics in nursery/landscape
Science in nursery/landscape
Biological pest control systems
Career opportunities in nursery/landscape
Educational needs of nursery/landscape personnel
Effective communications
Orientation to higher education in nursery/landscape
Integrated pest management systems
Industry certification programs
Industry organizations
Interiorscaping
Marketing nursery/landscape products and services
Plant identification
Plant nomenclature
Homeowner services in nursery/landscape
Orientation to genetic engineering and plant breeding
Personal relations
Environmental protection
Problem solving
Sources of supply and demand data
Standardized plant sizing systems
Standardized production inputs
Standardized tagging and marking systems
State and federal regulations
Computers in the nursery/landscape business
Herbaceous perennials
Low maintenance annuals
Advertising by industry organizations
Water conserving irrigation techniques

Figure 1. Curriculum Content Items

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A NURSERY/LANDSCAPE PROGRAM IN AGRICULTURAL EDUCATION FOR THE NEW MILLENNIUM: A FUTURE STUDY UTILIZING THE DELPHI TECHNIQUE

A Critique

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The rapid acceleration of change and constant introduction of new technology in the agriculture and horticulture industries makes it difficult to keep curriculum for preparing workers in these fields relevant to industry needs. As the researchers suggest, the task analysis model used in the 1970's to identify curriculum content no longer serves us well if the tasks have changed by the time the curriculum is being used by educators. The researchers are to be commended for experimenting with an alternative approach for collecting information that will be used to develop relevant curriculum for the nursery/ landscape industry.

The objectives, procedures, and analysis of data seem appropriate for achieving the purpose of the research. The demographic profile of the opinion leaders was helpful and left only one unanswered question. Were the 29 experts sufficiently located across the different geographic regions of the nation to insure that the data collected is appropriate for nationwide curriculum planning? The panel members certainly possessed sufficient years of experience in the business to be qualified experts.

The curriculum content areas provide a framework for identifying appropriate units of instruction to prepare workers for jobs in the nursery/landscape business. It would be interesting to compare this list with the content of current educational programs preparing workers for the industry. The conclusions and recommendations support the use of the Delphi technique to collect data for curriculum planning. I would suggest that conclusion number four (there will be increased employment opportunities) is in need of further investigation. Though I do not disagree with the conclusion, I believe more concrete data should be collected in this area before making the recommendation that "nursery/landscape course work in Agricultural Education should be emphasized and expanded".

The concluding comment in the paper appropriately summarizes the importance of the study. Educators can have a decisive role in the future of industry by providing "forward looking" curriculum.

SAFETY PRACTICES AND EQUIPMENT USED IN MISSISSIPPI SECONDARY AGRICULTURAL MECHANICS LABORATORIES

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INTRODUCTION

Students in agricultural mechanics learn in an environment fraught with potential hazards. The very nature of the curriculum requires relatively inexperienced students to interact with tools, equipment, supplies and situations which present very real possibilities for serious injury or death.

Given these circumstances, it is evident that "the most important responsibility of any teacher in an agricultural mechanics setting is to ensure the safety of the students" (Daniels, 1980, p.4). Storm (1979, p.136) reinforced this concept when he stated that "Students who are just learning to use equipment which is potentially dangerous present special problems. The responsibility for the physical welfare of the students rests with the instructor."

Recognizing the dangers inherent in the agricultural mechanics instructional setting, teacher educators of the past (Cook, Walker and Snowden, 1952) and present (Bear and Hoerner, 1986) have stressed the importance of safety. Unfortunately, several studies have documented that unsafe conditions exist in the nation's agricultural mechanics laboratories (Bennett, 1983; Lamb, 1984; Rudolph and Dillon, 1984; Gliem and Hard, 1988; Hoerner and Bekkum, 1989; and Baugher and Slocombe, 1990).

Burke (1990) surveyed Virginia teachers to determine the frequency and severity of student accidents which occurred in the state's agricultural mechanics laboratories during the 1987-1988 school year. The 186 teachers responding to the survey reported a total of 954 student accidents during the one-year period. The teachers also reported that 48 (5%) of the accidents were severe enough to require the care of a doctor and/or nurse. Based on the results of this study, Burke (1990) concluded that:

> The large number of accidents and severity of accidents occurring in the study population should be of major concern to teachers, teacher educators, supervisors and administrators. These facts should serve as a basis for renewed inservice and preservice emphasis on safety . . . (p.28).

Gliem and Hard (1988) examined the extent to which Ohio agricultural mechanics laboratories were in compliance with nationally recognized safety standards. The researchers found that none of the 145 laboratories studied was in total compliance with safety standards for the 10 areas investigated. The percentage of laboratories in compliance with individual safety areas ranged from a low of 1% for the tool safety area to a high of 48% for the compressed air equipment safety area.

Based upon the results of the study, Gliem and Hard (1988) concluded that Ohio agricultural mechanics laboratories were not in compliance with accepted safety standards. They further concluded that agriculture teachers and school administrators were extremely vulnerable to charges of negligence in the event of a laboratory accident.

The findings by Gliem and Hard (1988) are similiar to the results of studies conducted in other states (Bennett, 1983; Lamb, 1984; Rudolph and Dillon, 1984; Gliem and Hard, 1988; Hoerner and Bekkum, 1989; and Baugher and Slocombe, 1990). Kigin (1983) may well have summarized the status of safety in agricultural mechanics laboratories when he stated:

> We stand in awe of the progress that has been made in industry to make the manufacturing process safe for workers, and then with chagrin realize that not enough has been done in the schools. Violations of safe work practices are still quite evident, with hazards being ignored and emergency equipment inadequate (p.81).

The National Safety Council has estimated that 95% of all work-related accidents could be avoided if proper safety precautions were employed (Storm, 1979). Therefore, agricultural educators in Mississippi determined that a need existed to examine the agricultural mechanics safety practices currently used in the state's secondary agriculture programs.

PURPOSE AND OBJECTIVES

The purpose of this study was to examine safety conditions and practices in Mississippi secondary agricultural mechanics laboratories. The study was designed to provide baseline data from which recommendations for safety program improvement and inservice offerings could be made. Specific objectives were as follows:

1. To determine selected personal and situational characteristics of Mississippi secondary production agriculture and agricultural mechanics instructors.

2. To determine the agricultural mechanics safety practices used by Mississippi secondary production agriculture and agricultural mechanics instructors.

3. To determine the safety and emergency equipment items available in Mississippi secondary production agriculture and agricultural mechanics laboratories.

4. To determine the instructional methods and materials used by Mississippi secondary production agriculture and agricultural mechanics instructors to teach safety in agricultural mechanics.

PROCEDURES

The population for this study was composed of all Mississippi secondary production agriculture and agricultural mechanics teachers employed for the

1989-1990 academic year. Jones, assistant state supervisor of agricultural education, provided the researchers with a list of all such teachers. The entire population of teachers was surveyed (N=134).

The descriptive research design was used to meet the research objectives. Data were collected using mailed survey instruments.

The instrument developed by Hoerner and Bekkum (1989) to assess safety in Iowa agricultural mechanics laboratories was slightly modified to fit Mississippi conditions and used in the present study. Other versions of the instrument have been successfully used in similiar studies in Illinois, Kansas, Nebraska, Ohio and Oregon (T.A. Hoerner, personal communication, September 1, 1989).

The revised instrument was examined by experts in agricultural education and agricultural mechanization at Iowa State University and Mississippi State University and was judged to be valid. Since items requested factual responses and were reported on an individual basis, overall instrument reliability was not estimated.

The SPSS/PC (Norusis, 1986) statistical program was used for data analysis. Descriptive statistics were used to meet the research objectives.

RESULTS

As a result of two instrument mailings and two follow-up postcards, useable responses were received from 85 of the 134 teachers (63% response rate). Comparison of early and late respondents on selected demographic variables, safety practices used and safety and emergency equipment available indicated that no significant ($p<.05$) differences existed. Therefore, the results were judged to be generalizable to the population (Miller and Smith, 1983).

The typical respondent was male, had 13.25 (S.D.=8.82) years of teaching experience, taught agricultural mechanics 53.9% (S.D.=28.5%) of the time and had liability insurance coverage of 100,000 dollars or more (70.7%). Only 25.3% of the respondents reported having a school nurse available while teaching agricultural mechanics; only 30.1% of the instructors were certified in first aid.

The respondents reported having completed an average of 13.23 (S.D.=8.82) undergraduate and 6.15 (S.D.=7.23) graduate semester hours of coursework in agricultural mechanics. The respondents estimated that 14.7% (S.D.=13.3%) of the instructional time in their university agricultural mechanics courses had been devoted to safety instruction.

The typical agricultural mechanics laboratory was 2000 square feet or more in size (72%) and was over 15 years of age (73.5%). The respondents reported an average total program enrollment of 52.30 (S.D.=25.20) students. The average agricultural mechanics class had an enrollment of 14.84 (S.D.=5.37) students.

Requiring students to successfully complete safety exams (92.9%) was the most commonly reported safety practice, while the provision of non-skid floor surfaces around power tools (4.7%) was the least commonly reported safety practice. Only 4 of the 15 selected safety practices were used by more that 75% of the respondents. Eight of the 15 safety practices were used by less than 50% of respondents. Table 1 lists the number and percentage of respondents who reported using each safety practice.

Table 1.

Agricultural Mechanics Safety Practices Used by Mississippi Secondary Agriculture Teachers.

	Response			
	Use Practice		Do not use practice	
Safety Practice	n	%	n	%
Students required to pass safety exams	79	92.9	6	7.1
Safety zones around power tools	74	87.1	11	12.9
Student safety exams kept on file	71	83.5	14	16.5
Laboratory clean-up schedule	69	81.2	16	18.8
Safety guards on all equipment	67	74.1	18	25.9
Exits clearly marked	46	54.1	39	45.9
Safety posters near power tools	45	52.9	40	47.1
Safety rules posted near power tools	37	43.5	48	56.5
Scheduled safety inspections conducted	37	43.5	48	56.5
Power tools are safety color coded	37	43.5	48	56.5
Written accident report forms completed and filed	35	42.2	48	57.8
Student clean-up foreman designated	31	36.5	54	63.5
Student safety engineer designated	11	12.9	74	87.1
Mississippi eye safety law posted	7	8.2	78	91.8
Non-skid floor around power tools	4	4.7	81	95.3

Fire extinguishers (97.6%) were the most frequently reported safety or emergency equipment item available in the respondents' agricultural mechanics laboratories. Fire blankets (2.4%) were the least frequently reported item. Only 4 of the 18 selected safety or emergency equipment items were available in more than 75% of the respondents' agricultural mechanics laboratories. Seven of the 18 items were available in less than 50% of the laboratories. Table 2 lists the number and percentage of respondents reporting each item.

Table 2.

Safety and Emergency Equipment Items in Mississippi Secondary Agricultural Mechanics Laboratories.

	Response			
	Available		Not Available	
Equipment Item	n	%	n	%
Fire extinguishers	83	97.6	2	2.4
Welding gloves	82	96.5	3	3.5
Industrial quality eye protection devices	80	94.1	5	5.9
First aid kit	67	78.8	18	21.1
Welding exhaust system	63	74.1	22	25.9
Welding booths with screens/curtains	56	65.9	29	34.1
Vehicle safety stands	55	64.7	30	35.3
Safety cans for flammable liquids	51	60.0	34	40.0
Dust masks	48	56.5	37	43.5
Respirators	46	54.1	39	45.9
Welding aprons	45	52.9	40	47.1
Ear muffs	41	48.2	44	51.8
Flammable liquid cabinet	36	42.4	49	57.6
Shop coats/coveralls	33	38.8	52	61.2
Ear plugs	25	29.4	60	70.6
Fire alarm	17	20.0	68	80.0
Hard hats	9	10.6	76	89.6
Fire blankets	2	2.4	83	97.6

The respondents devoted an average of 17.2% (S.D.=14.3%) of their instructional time in agricultural mechanics to teaching safety. On average, safety was taught as a separate instructional unit 32.4% (S.D.=23.0%) of the time while being integrated into technical subject matter units 67.6% (S.D.= 23.0%) of the time. Table 3 shows the teaching methods and materials used by the respondents to teach safety in agricultural mechanics.

Table 3.

Instructional Methods and Materials Used by Mississippi Secondary Agriculture Teachers to Teach Agricultural Mechanics Safety.

	Response			
	Use		Do not use	
Teaching Method/Material	n	%	n	%
Method				
Teacher demonstrates safe hand tool use	82	96.5	3	3.5
Teacher demonstrates safe power tool use	81	95.3	4	4.7
Classroom lecture, discussion, supervised study	76	89.4	9	10.6
Students demonstrate safe power tool use	76	89.4	12	14.1
Students demonstrate safe hand tool use	73	85.9	12	14.1
Material				
Books or manuals	77	90.6	8	9.4
Worksheets	62	72.9	23	27.1
Videotapes	53	62.4	32	37.6
Transparencies	45	52.9	40	47.1
Slides/filmstrips	43	50.6	42	49.4
16mm films	35	41.2	50	58.8
Microcomputer programs	3	3.5	82	96.5

CONCLUSIONS AND RECOMMENDATIONS

Mississippi secondary production agriculture and agricultural mechanics instructors are not using recommended safety practices or providing student safety and emergency equipment to the extent warranted by the hazards present in the agricultural mechanics laboratory. This finding is consistent with the results of similiar studies in Missouri (Bennett, 1983; Lamb, 1984), Nebraska (Rudolph and Dillon, 1984), Ohio (Gliem and Hard, 1988), Iowa (Hoerner and Bekkum, 1989) and Kansas (Baugher and Slocombe, 1990).

Based on the results of this study, it is apparent that unsafe conditions exist in many Mississippi secondary agricultural mechanics laboratories. Safety program improvement must become a top priority for agricultural educators in Mississippi.

The following recommendations are based on the results of this study:

1. Teacher educators and state supervisors should emphasize agricultural mechanics safety during local program visits. Recommendations for safety program improvement should be made and progress should be monitored.

2. Inservice programs on agricultural mechanics safety should be planned and conducted. The programs should focus on how to plan and implement comprehensive agricultural mechanics safety programs.

3. A demonstration project should be conducted to develop a model agricultural mechanics laboratory which complies with all applicable OSHA safety standards.

4. Preservice agricultural education programs in Mississippi should be examined to determine if additional emphasis should be placed on safety in agricultural mechanics.

5. Vocational education policy makers in Mississippi should consider earmarking a portion of state equipment funds for use in purchasing safety and emergency equipment items.

6. Research should be conducted to identify factors which prevent teachers from using recommended safety practices and equipment in agricultural mechanics.

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SAFETY PRACTICES AND EQUIPMENT USED IN MISSISSIPPI SECONDARY AGRICULTURAL MECHANICS LABORATORIES

A Critique

Jeffrey W. Moss, University of Illinois -- Discussant

The studies summarized in this excellent introduction to the topic of safety practices and equipment used in secondary agricultural mechanics programs should convince any reader of the importance for investigating the potential problem in their own state. The researchers are to be commended for examining the situation in Mississippi. Unfortunately, the results of their investigation are more of an indictment than a commendation for Mississippi programs with serious deficiencies in safety conditions and practices.

The objectives of the study adequately support the purpose for the research and the procedures for collecting the information (use of the Hoerner and Bekkum instrument) allow for comparisons to be made between Mississippi and other states. Utilizing an expert panel to review the instrument for use in Mississippi programs increases the validity of the data.

I would suggest one improvement in the procedures used to collect your data. The comparison of early and late respondents for verifying generalizability of the results may not always be adequate. Could you have possibly visited a sample of non-respondents, collected the data by personal interview, and then compared the findings with your results. Had you done this I would be more comfortable that the data from your 63% response rate is reflects the entire population of Mississippi programs.

The conclusions and recommendations for this study are appropriately based on the data presented in the paper. Safety program improvement must become a top priority not only in Mississippi but in other states as well. Given what you now know in Mississippi, I would like to suggest that the first step in solving the problem resides in the final recommendation of the paper. The answer to why teachers don't use recommended safety practices and equipment is critical to planning programs to correct the situation. All of us in the profession would benefit from knowing that answer.

Correlates of Accidents in Ohio Vocational Agriculture Mechanics Laboratories

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INTRODUCTION

Accidents are recognized as a leading cause of death and injury for persons one to 37 years of age (National Safety Council [NSC], 1988, p. 8). Agriculture continues to be one of the most hazardous industries. In 1987, the National Safety Council reported that agriculture had the highest occupational death rate (53 per 100,000 workers) of any industry division (NSC, 1990, p. 37). This was more than five times the combined industry average (9 per 100,000) as reported by the NSC. The National Institute for Occupational Safety and Health (NIOSH) reported that agriculture was one of the top four industries for occupational death rates of workers 16 years of age and older (NIOSH, 1989, p. 27). The NIOSH rate for agriculture (20.7/100,000 workers) was nearly three times higher than the combined private sector death rate of 7.9/100,000 workers.

With the agriculture industry having such high rates for occupational death, a natural question one might raise would be "What type of safety training are students receiving that choose a career in the agriculture industry?". One way to ascertain this would be to observe information such as the number of injuries and deaths that occur in high school vocational agriculture mechanics laboratories. These laboratories and the attitudes of the teachers and students towards safety could provide insight into the importance given to safe work practices in these courses.

The NSC (1987) reported about 19,200 accidents occurred in vocational-industrial arts laboratories for the academic years of 1984-85 and 1985-86. These accidents resulted in nearly one lost day per injury. Firenze and Walters (1981) suggested the number of injuries in schools would actually be much higher due to non-reporting of accidents and because many accidents do not cause property damage or a loss of at least one-half day of school and are unreported. The data reported by the NSC are not categorized by educational division (vocational vs industrial arts); thus, it is impossible to ascertain the number of injuries related to vocational agriculture. In the 1960's, Ohio required vocational agriculture teachers to submit accident information in a yearly report, but compliance rates were so low this practice was discontinued. In addition, the NSC has discontinued collecting data for the student accident rate tables by school grade, from which the estimation of the number of injuries occurring in school vocational/industrial shops and laboratories were derived. Thus, a current study was warranted to determine the types, frequencies, and location of work area accidents resulting in injury in Ohio vocational agriculture mechanics facilities.

PURPOSE

While data exist that would indicate how many accidents were occurring in school vocational/industrial laboratories resulting in injury, none were known to exist for vocational agriculture specifically in Ohio. This study was designed to fulfill a need for data regarding the types, frequencies, and location of accidents that occurred in Ohio vocational agriculture mechanics laboratories. In addition, the relationships between accidents, safety attitudes of teachers, and safety attitudes of students with selected variables were investigated.

OBJECTIVES

The objectives of the study were to:

1. Determine the types, frequencies, and location of accidents that occurred in Ohio vocational agriculture laboratories.

2. Describe the characteristics of teachers, facilities, and students that could affect safety knowledge and instruction.

3. Describe the accident reporting procedure of agricultural mechanics programs and where best to obtain this information.

4. Describe the type and amount of safety instruction given to students.

5. Describe the attitudes of teachers toward:
    a. safety practices
    b. safety of school laboratories
    c. safety knowledge

6. Determine relationships between instructors' attitude toward safety and selected variables, such as amount of instruction in agricultural mechanics, length of time teaching, etc.

7. Determine relationships between frequency of accidents and selected variables, such as type of safety instruction, amount of safety instruction, facility safety score, etc.

8. Determine relationships between students' safety attitude and selected variables, such as students perception of instructor safety attitude, students' perception of instructor safety knowledge, and students' perception of the home and school safety environment.

PROCEDURES

The design of the study would be described as descriptive correlational research (Ary, Jacobs, & Razavieh, 1985). Units surveyed were schools having traditional vocational agriculture programs, using teachers and students as the respondents.

The target population for the study was 145 schools which had been randomly selected from a universe of Ohio production agriculture programs (N=261) who had previously completed a safety compliance evaluation form, based on OSHA standards, about their vocational agricultural mechanics facility in 1988. The target population of 145 schools was selected since data had been collected on the compliance of the agricultural mechanics facilities with established safety standards. This was a variable of interest to be studied in the correlation of accidents. Random sampling was done of this population to obtain a representative sample (N=103) from the target population with an accepting sample of 80 schools, resulting in a response rate of 78%. A random sample of 10% of the non-respondents were contacted and their answers compared to respondents to evaluate representativeness of the respondents for the complete sample. The nonrespondents were statistically compared to the respondents through the use of a t-test with an a priori alpha level of .05 and were not found to be significantly different.

Teachers of agricultural mechanics were asked to complete a questionnaire to assess their safety attitudes, safety knowledge, safety practices, and to report occurrences of injuries in the agricultural mechanics laboratory for the academic years of 1987-88 and 1988-89. In order to administer the student questionnaire, teachers were to randomly select every third student on the class roster until five students were selected from the one class that received the most agricultural mechanics instruction. The sample sizes were selected and based on Krejcie and Morgans' (1970) suggested sampling techniques. It was requested that all responses be completed at the same time. Demographic data were collected from all respondents.

ANALYSIS OF DATA

All data were coded and appropriate statistical procedures were used for reporting measures of central tendency, frequencies, and correlations. The SPSS/PC+ V3.0 microcomputer statistical package was used.

RESULTS

There were 254 total reported injuries for the time frame of 1987-89. The majority of injuries (n=196) were of the minor, first-aid type being treated in the agricultural mechanics facility and occurred primarily in the woodworking or welding/metal area (Table 1). There were 41 injuries treated by a school nurse, 15 treated by a physician, and two resulting in permanent injury (both in the woodworking area). Surface cuts (n=80), burns (n=71), and scratches (n=58) constituted the most frequent type of injuries with fingers (n=167), eyes (n=27), and feet (n=14) being the most frequently occurring part of the body injured.

The average agricultural mechanics facility age was 25 years and was an average of 2,500 square feet in size. The average class size was 17 students and the average length of the instructional class period was 74 minutes (a bimodal distribution of 50 and 90 minutes). The majority of students (70%) who responded were either from a working farm or a country home; two-thirds indicated they had classes prior to the current vocational agriculture class in which safety was taught; over one-half indicated they had received safety instruction in prior vocational agriculture classes; and one-fourth indicated they had industrial arts or a science laboratory where safety was taught. Teacher responses indicated they had an average length of experience of 13 years teaching agricultural mechanics, had taken 15 quarter hours of undergraduate agricultural mechanics courses, and had received safety instruction about 11% of the total time in their undergraduate agricultural mechanics classes. Slightly more than one-half (56%) of the schools indicated they had a centralized procedure for reporting accidents, usually to the principal (71%) or school nurse (25%).

Using a six point Likert-type (Ary et al., 1985) scale (6=very strongly disagree, 5=strongly disagree, 4=disagree, 3=agree, 2=strongly agree, 1=very strongly agree) to assess their safety attitude, students, as a group, perceived themselves as from slightly above midpoint (2.8) to high (1), indicating safety was a concern to them and was important. However, there were wide individual variations, ranging from six to one.

Davis' (1971) suggested method of describing the magnitude of correlations was utilized:

1.0	Perfect
.70-.99	Very High
.50-.69	Substantial
.30-.49	Moderate
.10-.29	Low
.01-.09	Negligible

In examining the relationship of students' safety attitude, positive correlations were found with how the students perceived their parents' safety knowledge (r=.58) and their parents safety attitude (r=.68). Also, students' perception of their teachers safety knowledge (r=.64) and students' perception of their teachers safety attitude (r=.64) each showed a substantial positive correlation with the student safety attitude variable. In addition, the home safety environment (r=.68) and school safety environment (r=.47) had substantial to moderate positive correlations with the students' safety attitude (Table 2).

In observing the relationship of frequency of accidents with selected variables, there were low negative associations between the minor first-aid type injuries and the percent time spent teaching safety to students (r=-.16), amount of safety instruction received at the undergraduate level (r=-.16), and the number of agricultural mechanics courses taken at the undergraduate level (r=-.22). There were moderate negative associations with accidents treated by a school nurse (r=-.35) or a physician (r=-.36) and the facility safety compliance score variable. These types of accidents tended to decrease as these variables increased.

Teachers preferred to give safety instruction as an integrated part of their instruction versus separating it out into a block unit to teach students. The mean percentage of instructional time spent teaching safety to students was 17 percent, with a range from 2 percent to 75 percent.

As a group, teachers ranked themselves high on their attitudes toward safety practices, safety knowledge, and the safety of their school laboratories. Individually, though, some teachers indicated a lack of safety training. In addition, most teachers responded that it was important to know the recommended guidelines for noise, lighting and ventilation levels, yet nearly 50% did not know what these levels were. While almost all teachers (97%) indicated that knowing the Ohio safety laws which impacted their laboratory were important, 24% indicated they did not know the laws. More than 50% replied they might teach unsafe practices by example, greater than 90% believed they were less careful than they should be at times, 25% felt their laboratories were hazardous to work in, and more than 75% replied their tools were sometimes unsafe to operate (Table 3). Using unsafe equipment has been shown to be a prime factor in accident/injury causation (Bear & Hoerner, 1986; Conners, 1981; Kigin, 1983).

Approximately 10% of the teachers indicated they did not require everyone to wear safety glasses in their laboratories, even though this is a state law. Additionally, about 20% of the schools reported eye injuries. The data suggest that the majority of the eye injuries were from welding burn or welding "flash", although that cannot be confirmed.

CONCLUSIONS

1. Vocational agriculture programs should have a more stringent accident reporting procedure. In order to accurately assess the number and types of accidents occurring, schools should require and maintain accident report records. This has an important role in any accident prevention program. In addition, the areas in which accidents are occurring can be more accurately identified and measures to reduce the number of accidents in these areas can be implemented.

2. Teacher education programs should increase the amount of time spent on safety. The average amount of time teachers reported spending on safety in their undergraduate agricultural mechanics classes was 11% of the total time. This amount of time would appear to be insufficient to thoroughly teach the importance of safety and to instill in teachers the appropriate attitude related to the importance of providing safety instruction.

3. Teachers should model a positive safety attitude, demonstrate correct safety practices, provide accurate and factual safety information, and provide a safe school laboratory setting in which to work and learn. Since students' safety attitudes had a substantial positive correlation with their perception of their teachers' safety attitude and knowledge, teachers could play a significant part in the students' safety attitude and, as such, should be aware of the role they play. Additionally, the effect parents have on students' safety attitudes should be recognized and a more active part taken by teachers to incorporate this aspect into their safety training and information.

4. All teachers should have the opportunity to learn the requirements and laws which impact their laboratories. Almost all teachers indicated they should know the Ohio safety laws that impacted their laboratories, but about one-quarter indicated they did not know these laws. Almost all teachers indicated they believed it was important to know the recommended noise, lighting and ventilation levels but about 50% indicated they did not know these levels; thus the assumption is made that they have the desire to obtain this information. All teachers should have the opportunity to participate in a program that teaches them the requirements of lighting, ventilation, and noise requirements for school laboratories, either as a course taught at the university level for undergraduate preservice teachers or as inservice education.

5. Continued emphasis by teacher education programs on hazard awareness principles, such as machine guarding, safe handtool operation, proper welding procedures, etc. is recommended. The number of injuries occurring to students from these hazards warrants efforts in these areas.

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Table 1

Type and Frequency of Accidents by Percent of Schools and Accident Area

Accident Severity	Frequency of Injury	Percent of Schools	Accident Area			
			Wood work	Weld/ metal	Gen. shop	Field trip
First Aid Laboratory	196	66	81	73	1	4
First Aid School Nurse	41	25	9	16	3	2
Physician's Office Treatment	15	18	8	6	2	0
Permanent Injury	2	1	2	0	0	0
Fatality	0	0	0	0	0	0
National Safety Council Definition of Reportable Accident	33	29	-	-	-	-

N=80

Table 2

Relationship of Student Safety Attitude to Selected Characteristics

Characteristics	r	N
Instructor Safety Attitude	.14	75
Student Perception of Teacher Safety Attitude	.68**	80
Student Perception of Teacher Safety Knowledge	.64**	80
Student Perception of School Safety Environment	.47**	80
Student Injured in a Serious Accident	.06	80
Student Injured in Agriculture Laboratory	.26*	80
Student Incurring Serious Injury on the Job	.14	80
Student Had Close Friend/Relative Injured	-.12	80
Student Had Close Friend/Relative Killed	-.13	80
Student Perception of Parent's Safety Knowledge	.58**	80
Student Perception of Parent's Safety Attitudes	.68**	80
Student Perception of Home Safety Environment	.68**	80

*p<.05 **p<.001

Table 3

Frequency and Means of Teacher Responses to Selected Attitudinal and Actual Practice Items

	Level of Agreement						
	1	2	3	4	5	6	M
I consider safety to be important.	68	12					1.2
I think student safety behavior is of the utmost importance.	67	13					1.2
I generally follow safe practices.	26	49	5				1.7
Sometimes I am less careful than I should be.	3	24	43	5	3	2	2.8
I am competent in my knowledge of safety practices.	22	49	9				1.8
Many times I might teach unsafe practices by example.		7	9	29	23	12	4.3
My school laboratory is a hazardous place to work.	6	9	6	21	26	11	4.0
It is important to keep power equipment in a safe working condition.	60	18	2				1.3
My laboratory tools are sometimes in an unsafe operating condition.		8	33	19	17	3	3.7
I should know the Ohio safety laws that impact my laboratory.		23	27	28	2		2.1
It is important to follow recommended ventilation requirements for laboratories.	32	31	16				1.8
It is important to require students to wear safety glasses.	63	14	3				1.3
It is important to follow recommended safe noise levels in the laboratory.	12	32	34	2			2.3
It is important to maintain recommended safe lighting level in the laboratory.	24	37	19				1.9

I know the Ohio safety laws that impact my laboratory.
YES 61 NO 19

I know the recommended ventilation requirements for my laboratory.
YES 42 NO 38

I require everyone to wear safety glasses in my laboratory.
YES 73 NO 7

I know the recommended safe noise level guidelines for my laboratory.
YES 27 NO 52

I know the recommended safe lighting level for my laboratory.
YES 40 NO 40

N=80

1=Very Strongly Agree	4=Disagree
2=Strongly Agree	5=Strongly Disagree
3=Agree	6=Very Strongly Disagree

CORRELATES OF ACCIDENTS IN OHIO VOCATIONAL AGRICULTURE MECHANICS LABORATORIES

A Critique

Jeffrey W. Moss, University of Illinois -- Discussant

Agricultural mechanics laboratories are not as safe as they should be! Previous research has documented that statement for the states of Iowa, Kansas, Mississippi, Missouri and Nebraska. Unfortunately, Ohio must now be added to the list. However, since knowing a problem exists is the first step to solving it, the researchers should be commended for investigating the safety of Ohio agricultural mechanics laboratories.

The introduction to the paper documents that agriculture is a hazardous occupation and appropriately poses the natural question, "What type of safety training are students receiving that choose a career in agriculture?" The introduction establishes a rationale for the study and the only suggested improvement might be to reference some of the recently completed studies in agricultural education which concern this topic. The paper by Fletcher and Johnson presented in this session provides an excellent example.

The procedures and methods for analyzing the data seem appropriate. The results verify a need for making improvements in teacher training and in the environment of the school agricultural mechanics laboratories. The number of accidents occurring in Ohio agricultural mechanics laboratories is considerably fewer than those reported by Burke for Virginia programs and the reader is encouraged to examine both studies if investigating the frequency of accidents in vocational agriculture programs.

The conclusions made by the researchers offer sound recommendations for making program improvements. The only recommendation which should be further scrutinized is "for teacher education to increase the amount of time spent on safety to instill in teachers the proper attitude related to the importance of providing safety instruction". While I agree in principle with expanding the time devoted to safety topics, I gleaned from your study that "teachers ranked themselves high on their attitudes toward safety practices...". It may be more important to critically examine what is taught in the limited amount of time devoted to safety instruction as suggested in conclusion four.

HERZBERG'S MOTIVATOR-HYGIENE THEORY AND THE JOB SATISFACTION OF AGRICULTURAL EDUCATION FACULTY

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INTRODUCTION

Numerous researchers have investigated the concept of job satisfaction and factors that explain how satisfied workers are with their positions. Much of the research on this topic has focused on employees in the private sector (Niehouse, 1986; Lacy, Bokemeier, & Shepard, 1983; Lawler & Porter, 1968; Herzberg et al. 1957). Several researchers have examined the job satisfaction of professionals such as extension agents and secondary agricultural education teachers (Mallilo, 1990; Cochran, Lawrence, Odell, & Gartin, 1989; Van Tilburg, 1988, 1987; Kotrlik & Malek, 1986; Grady & Burnett, 1985; Keffer, 1976; Warner 1973). The consensus reached in most of the above studies is that the agents and teachers are satisfied with their positions.

Few researchers, however, have examined the job satisfaction of professionals such as medical doctors, lawyers, veterinarians, and university faculty. Four notable exceptions include studies by Schultz (1977) who studied the job satisfaction of faculty in colleges of home economics; Bowen (1980) who tested the Herzberg motivator-hygiene theory as it applies to agricultural education faculty; Blezek (1987) who tested the validity of the Herzberg motivator-hygiene theory using College of Agriculture faculty at the University of Nebraska; and Cowie, Gartin, Odell, and Lawrence (1989) who studied the job satisfaction of agriculture and forestry faculty at West Virginia University. Faculty included in the above studies tended to be moderately to very satisfied with their positions.

In the above four studies, several demographic and situational variables were studied to determine to what extent they were related to faculty members' job satisfaction. Schultz (1977) found that academic rank, time in present rank, time at present institution, age of faculty, and tenure status were not related to home economics faculty members' job satisfaction. Bowen (1980) found that variables such as age, type of institution, academic rank, years of high school and college teaching experience, size of the faculty, and tenure status were not related to the job satisfaction of agricultural education faculty. In addition, demographic variables that Blezek (1987) investigated tended not to be related to how satisfied Nebraska College of Agriculture faculty were with the 10 Herzberg motivator-hygiene factors. Finally, Cowie, Gartin, Odell, and Lawrence (1989) also found that demographic variables tended not to be related to the job satisfaction or dissatisfaction of West Virginia University agriculture and forestry faculty.

From a theoretical perspective, Bowen (1980) concluded that the Herzberg et al. (1957) theory did not hold true for teacher educators in agriculture because both the motivator and the hygiene factors explained the job satisfaction of agricultural education faculty. However, the findings of the Blezek (1987) and the Cowie, Gartin, Odell, and Lawrence (1989) studies tended to confirm the validity of the theory. Both the University of Nebraska and the West Virginia University college of agriculture faculty tended to be more satisfied with the motivator factors than they were with the hygiene factors.

During the 1980s, few studies were conducted to assess the job satisfaction of agricultural education faculty. In addition, no study has been conducted to determine if the job satisfaction of this group of faculty tends to be constant phenomenon or if it tends to fluctuate.

PURPOSE AND HYPOTHESES

The primary purpose of this study was to determine if the job satisfaction of agricultural education faculty is a constant phenomenon. A secondary purpose was to assess the applicability of the Herzberg et al. (1957) motivator-hygiene theory to agricultural education faculty. This theory suggests that job satisfaction and dissatisfaction are independent constructs, each influenced by a different set of factors. According to Herzberg et al., the job satisfaction of faculty will be influenced by the faculty's sense of achievement, advancement, recognition, responsibility, and the type of work inherent in being a faculty member. Dissatisfaction, meanwhile, will be related to how faculty perceive variables such as interpersonal relationships involved in being a faculty member, a university's policies and administration, how their salaries are determined as well as the amount of the salary, the type of supervision received (supervision-technical), and working conditions within the university community (Bowen, 1980).

Based on the Herzberg et al. (1957) theory and the findings of the Bowen (1980), the Blezek (1987), and the Cowie, Gartin, Odell, and Lawrence (1989) studies, the following hypotheses were formulated for testing at the .05 alpha level:

1. Job satisfaction is a constant phenomenon as indicated by no significant difference between the 1980 and 1990 levels of job satisfaction for agricultural education faculty.

2. The job satisfaction of agricultural education faculty will not be related to the faculty's age, tenure status, type of institution, and years of high school or college teaching experience.

3. The Herzberg motivator-hygiene theory will not apply to agricultural education faculty as indicated by both the motivator and the hygiene factors explaining significant amounts of variance in the job satisfaction of agricultural education faculty.

PROCEDURES

The population for the study included 307 faculty listed in the *Directory of Teacher Educators in Agriculture, 1989-1990* (Whaley, 1989). The study was limited to faculty who held assistant professor or higher academic rank and who had responsibility in teacher education, extension education, agricultural mechanics, and agricultural communications. Faculty with primary administrative appointments outside of agricultural education (director of resident instruction, deans, etc.) were excluded from the population. The population was stratified by type of institution (1862 land grant, 1890 land grant, and nonland grant) before a random sample of 154 faculty was selected. This sample size reflects a 5% margin of error with a 5% risk of drawing a bad sample (Krejcie & Morgan, 1970).

A questionnaire that Bowen (1980) developed was used to collect data for the study. Section one consisted of the *Faculty Job Satisfaction/Dissatisfaction* scale (Wood, 1973) to assess the 10 dimensions of the Herzberg motivator-hygiene theory: achievement, advancement, interpersonal relations, policy and administration, recognition, responsibility, salary, supervision, the work itself, and working conditions. Section two consisted of the *Brayfield-Rothe Job Satisfaction Index* (1951) as modified by Warner (1973). The third section consisted of items to measure selected demographic characteristics and the nature of faculty appointments.

Five agricultural and extension education faculty at The Pennsylvania State University judged the instrument to have acceptable content and face validity. Using data collected from the sample, a Cronbach's alpha reliability coefficient of .97 was obtained for the Wood (1973) *Faculty Job Satisfaction/Dissatisfaction* scale. In addition, the 10 subscales on the Wood instrument had good reliability (Cronbach's alpha ranged from .72 - .97). The *Brayfield-Rothe Job Satisfaction Index* also had good reliability (Cronbach's alpha = .87).

The instrument was mailed February 16, 1990 to 154 subjects included in the sample. A follow-up letter and another copy of the instrument were mailed to subjects who did not respond after three weeks. The data collection period ended two weeks later on March 23, 1990. Subjects who responded the first two weeks of the data collection period (early) were compared with those who responded the last three weeks (late). The 94 early and the 34 late respondents were not significantly different ($\underline{p}>.05$) on Herzberg's 10 motivator-hygiene factors, their level of job satisfaction, major responsibility, highest academic degree, age, academic rank, whether or not they were on a tenure track appointment, whether or not they were tenured, type of institution, and total years as a faculty member.

RESULTS

Almost 45% of the respondents were professors, 31% associate professors, and 24% assistant professors. Respondents had been in their present positions a mean of 13.6 years. Almost 88% had taught high school agriculture (mean of 5.4 years). Twenty respondents had been employed as county extension professionals (mean of 4.8 years). All but seven respondents held resident instruction appointments (mean time of appointment = 76.5%). Fifty respondents held experiment station appointments (mean time of appointment = 21.4%) and 24 respondents held extension appointments (mean time of appointment = 37.4%). Two-thirds of the respondents indicated that teacher education was their primary responsibility while administration was the primary responsibility for 13%. Other primary responsibilities include agricultural mechanics (6%), extension education (5%), and "other" (10%). The "other" category includes areas such as 4-H youth development, communications, graduate education, and international education. All but five respondents held tenure track appointments, and almost 73% were tenured. All but six respondents had earned doctoral degrees.

Means and standard deviations for the job motivator and hygiene factors are presented in Table 1. Findings consistent with those achieved in the Bowen (1980) study were identified. Except for achievement and responsibility, the 10 factors were ranked in the same order. Among the five motivator factors, respondents in 1980 and 1990 were most satisfied with the type of work involved in being a university faculty member (the work itself) and least satisfied with their opportunities for advancement. Among the five hygiene factors, faculty in 1980 and 1990 were most satisfied with interpersonal relationships inherent in being a faculty member and least satisfied with the level and method used to determine their salary. Overall, these findings tend to corroborate those achieved in the Cowie, Gartin, Odell, and Lawrence (1989) study. To a lesser extent, the findings also corroborate those achieved in the Blezek study (1987). Blezek's (1987) findings confirmed the validity of the Herzberg motivator-hygiene theory.

Scores on the *Brayfield-Rothe Job Satisfaction Index* (1951) could range from 14 to 70. However, as shown in Table 1, agricultural education faculty appeared very satisfied with their positions. The level of job satisfaction for this group of faculty was 62.9 in 1980 versus 61.8 in 1990. Thus, as hypothesized, job satisfaction for agricultural education faculty appears to be a constant phenomenon as indicated by no significant difference between the 1980 and 1990 levels of job satisfaction. In addition, the level of job satisfaction identified for agricultural education faculty is comparable to that of agriculture and forestry faculty at West Virginia University (Cowie, Gartin, Odell, & Lawrence, 1989).

As hypothesized, the job satisfaction of agricultural education faculty was not related to the faculty's age, tenure status, type of institution, and years of high school or college teaching experience ($\underline{p} > .05$).

Table 1

Means and Standard Deviations for Job Motivator Factors, Job Hygiene Factors, and Job Satisfaction for 1980 and 1990 Samples of Agricultural Education Faculty

	1980 Sample* (n=100)			1990 Sample (n=128)		
Factor	**Mean**	**SD**	**Rank**	**Mean**	**SD**	**Rank**
Motivator Factors						
The Work Itself	5.11	.70	1	5.44	.56	1
Responsibility	4.89	.92	2	4.69	.87	3
Achievement	4.79	.71	3	4.89	.51	2
Recognition	4.53	.99	4	4.38	.83	4
Advancement	4.30	1.03	5	4.20	.97	5
Hygiene Factors						
Interpersonal Relations	5.14	.78	1	5.02	.71	1
Policy & Administration	4.44	.37	2	4.24	1.00	2
Supervision-Technical	4.30	1.21	3	4.20	1.09	3
Working Conditions	4.26	.84	4	4.06	.74	4
Salary	3.70	1.29	5	3.76	1.27	5
Job Satisfaction Scores**	62.9	6.31	-	61.8	5.97	-

*** - From Bowen (1980) study; ** - t (226) = 1.22, $p > .05$**

As shown in Table 2, eight of the 10 Herzberg et al. (1957) factors were either low or moderately related to the job satisfaction of agricultural education faculty. In addition, significant interrelationships were found among the 10 factors. The two exceptions include no relationships between the work itself and (1) advancement and (2) salary. To test hypothesis 3 concerning how well the Herzberg motivator-hygiene theory applies to agricultural education faculty, two stepwise multiple regression models were constructed . As shown in Table 3, when job satisfaction was regressed on the motivator factors (achievement, advancement, recognition, responsibility, and the work itself), two factors explained 35% of the variance in the dependent variable (the work itself: R^2=.29; and responsibility: R^2=.06). Thus, the inherent nature of being a faculty member and the level of responsibility that faculty perceive that they have are the best indicators of how satisfied agricultural education faculty were with their positions.

In the second regression model, job satisfaction was regressed on the hygiene factors (interpersonal relations, policy and administration, salary, supervision-technical, and working conditions). As shown in Table 4, 24% of the variance in the job satisfaction scores was explained by two hygiene factors (interpersonal relations: R^2=.23 and salary: R^2=.01). Thus, contrary to the Herzberg theory, agricultural education faculty members' job satisfaction was explained by both the motivator factors and by two hygiene factors: (1) how satisfied the faculty were with interpersonal relationships involved in being a faculty member and (2) the methods used to determine their salary as well as the amount of the salary. Hypothesis 3 was accepted because both the motivator and the hygiene factors explained significant amounts of variance in the job satisfaction of agricultural education faculty.

Table 2

Intercorrelations Among the Job Motivator and Hygiene Factors and the Job Satisfaction of Agricultural Education Faculty

	Intercorrelations Among Variables										
	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Achievement (X1)	--	.63*	.59*	.52*	.53*	.57*	.24*	.39*	.47*	.46*	.44*
Advancement (X2)		--	.52*	.62*	.65*	.60*	.46*	.58*	.20	.65*	.28*
Interpersonal Relations (X3)			--	.64*	.62*	.59*	.40*	.59*	.38*	.54*	.48*
Policy & Administration (X4)				--	.70*	.63*	.60*	.82*	.33*	.67*	.24*
Recognition (X5)					--	.64*	.56*	.71*	.34*	.67*	.20
Responsibility (X6)						--	.53*	.62*	.34*	.64*	.39*
Salary (X7)							--	.52*	.05	.63*	.04
Supervision-technical (X8)								--	.30*	.63*	.24*
The Work Itself (X9)									--	.27*	.57*
Working Conditions (X10)										--	.25*
Job Satisfaction (X11)											--

* - Pearson correlation coefficients, $p < .05$.

Table 3

Stepwise Regression of Job Satisfaction on the Job Motivator Factors

Variable	Multiple R	Adj. R^2	R^2 Total	Beta	F
The Work Itself	.545	.297	.297	.80	36.1*
Responsibility	.606	.060	.357	.52	13.8*

* $p < .05$ for individual factors with 1, 126 df; for the model: F (2, 125) = 36.2; $p < .05$.

Table 4

Stepwise Regression of Job Satisfaction on the Job Hygiene Factors.

Variable	Multiple R	Adj. R^2	R^2 Total	Beta	F
Interpersonal Relations	.482	.232	.232	.55	42.50*
Salary	.506	.012	.244	-.17	3.92*

* $p < .05$ for individual factors with 1, 126 df; for the model: F (2, 125) = 21.5; $p < .05$.

CONCLUSIONS AND RECOMMENDATIONS

Three conclusions were formulated based on the findings of the study.

1. The job satisfaction of agricultural education faculty is a constant phenomenon as indicated by limited variation in the level of satisfaction over a 10 year period. In addition, agricultural education faculty are very satisfied with their positions.

2. Demographic and situational variables examined in this study are not good indicators of the level of job satisfaction for agricultural education faculty.

3. Because the motivator factors were better indicators of agricultural education faculty members' job satisfaction than the hygiene factors, the Herzberg motivator-hygiene theory tends to be more applicable to agricultural education faculty in 1990 than it was in 1980.

The following recommendations were formulated based on the findings of the 1980 Bowen study and the findings of this study:

1. Agricultural education faculty should use instruments included in this study to make self-evaluations to determine which aspects of their position are satisfying or dissatisfying. In addition, the findings should be considered as a norm for faculty to use in requesting sabbatical and professional leaves and enrichment activities which foster professional growth and development.

2. Faculty who teach and advise graduate students who aspire to become faculty members should use the findings to provide an overview of the academic environment in which agricultural education faculty function.

3. Senior agricultural education faculty should review and incorporate the findings when planning and implementing mentoring activities for junior faculty.

4. Department chairs and faculty who hold administrative appointments should consider the findings relative to interpersonal relations and salary when they seek to enhance hygiene factors.

5. Additional research is needed to determine how the level of job satisfaction for agricultural education faculty compares with that of other university faculty.

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HERZBERG'S MOTIVATOR-HYGIENE THEORY AND THE JOB SATISFACTION OF AGRICULTURAL EDUCATION FACULTY

A Critique

Jerry L. Peters, Purdue University--Discussant

I would like to compliment the researchers for their introduction to the paper which clearly states the problem based on a sound literature review and for their thoroughness in selecting the population and avoiding the threat of sampling error. They are also to be commended for their efforts in continuing to seek new information based on a previous study which was conducted by Bowen in 1980. The questionnaire used in the study yielded relatively high reliability coefficients and a panel of agricultural and extension education faculty judged the instrument to have acceptable content and face validity.

Appropriate statistics were used in analyzing the data. The conclusions were based on empirical evidence and the recommendation section provides insight into future research studies in this area.

Although I found the research to be well done, I do have a few concerns which I would like to address. The conceptual base or framework from which this study was built and the hypotheses formulated, was based on an earlier study conducted by Bowen. As a reviewer it would have been helpful to read a few paragraphs about the earlier study and the Herzberg theory concerning both motivator and hygiene factors so that I could conceptualize in my mind the direction this study was going.

My second point raises several questions concerning the selection of the sample population. Was thought given to using the same participants in the Bowen study of 1980? How similar were the demographics of the participants in the 1980 study to those in the 1990 study? What affect would a significant difference in the demographics between the two groups have on the three hypotheses of this study? It seems to me that in order to determine if the job satisfaction of a particular group (i.e., the 1980 study participants) changes or fluctuates over a period of time those exact same participants should be looked at again, in this case for the 1990 study.

Another question that I would like to raise concerning this study relates to the location of the Agricultural Education programs of the participants in the study. Did the researchers take into consideration the satisfaction of faculty whose Agricultural Education programs are administered though Schools or Colleges of Agriculture versus those that are administered thorough Schools or Colleges of Education?

A final question which the paper did not address relates to the number of FTE in a given Agricultural Education program. Does number of FTE have a direct bearing on how satisfied an agricultural education faculty member is with their job?

JOB SATISFACTION OF TEACHERS OF AGRICULTURE

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INTRODUCTION

> The research evidence clearly shows that employees' decisions about whether they will go to work on any given day and whether they will quit are affected by their feelings of job satisfaction. All the literature reviews on the subject have reached this conclusion. The fact that present satisfaction influences future absenteeism and turnover clearly indicates that the causal direction is from satisfaction to behavior (Lawler, 1977; p. 361).

To what extent has job satisfaction affected the profession of agricultural education in the public schools? Knight (1978) found that the number of secondary teachers in Ohio increased from 458 positions in 1970 to 610 positions in 1975. However, during this same time period, 263 Ohio agriculture teachers left the profession for reasons other than retirement and death. Likewise, Morgan (1988) concluded that approximately 11% of the secondary agriculture teachers left the profession annually for reasons other than retirement or death. Conditions today have not changed much: a shortage of qualified teachers of agriculture and high turnover rates continue to plaque the system.

If job dissatisfaction leads to employee turnover, then the question must be raised as to how satisfied are secondary agriculture teachers with their current employment? Newcomb, Betts, and Cano (1987) concluded that Ohio secondary agriculture instructors were fairly satisfied with their teaching positions. However, Newcomb et al. (1987) did not investigate specific factors leading to job satisfaction and/or dissatisfaction among teachers.

Simply knowing that employees are unhappy with their jobs is not sufficient to curb the negative consequences associated with job dissatisfaction (Davis & Newstrom, 1989; Lawler, 1977; Mowday, 1984; Porter & Steers, 1977). Rather, a thorough understanding is required as to which factors lead to job satisfaction and which create job dissatisfaction (Davis & Newstrom, 1989; Mowday, 1984; Berns, 1989).

PURPOSE AND OBJECTIVES

The purpose of this study was to determine overall job satisfaction and specific factors causing job satisfaction and job dissatisfaction among secondary agriculture teachers. To guide this study, the following research questions were investigated.

1. What were the characteristics of teachers of agriculture with respect to selected demographic variables?

2. What relationships existed between agriculture teachers' level of job satisfaction and the selected demographic variables?

3. What relationships existed between selected job satisfier factors (achievement, advancement, recognition, responsibility, and the work itself) and the job satisfaction of agriculture teachers?

4. What relationships existed between selected job dissatisfier factors (interpersonal relations, policy and administration, salary, supervision, and working conditions) and the job satisfaction of agriculture teachers?

PROCEDURES

POPULATION AND SAMPLE

For this descriptive-correlational study, the population was all secondary teachers of agricultural education in a Ohio (N = 558). The sample consisted of a census of secondary female agriculture teachers (N = 45) and secondary male teachers in the taxonomies of Agricultural Business (N = 29), Farm Business Planning and Analysis (FBPA) (N = 27), and Natural Resources (N = 13). A random sample (utilizing Cochran's (1977) formula for a 5% chance of error) of secondary male teachers of agriculture was drawn from Agricultural Mechanics (N = 81, n = 70), Horticulture (N = 71, n = 60), and Production Agriculture (N = 292, n = 170). The total sample constituted of 414 secondary teachers of agriculture.

INSTRUMENTATION

Wood's (1973) instrument was used to assess the level of job satisfaction. This instrument constituted Part I of the questionnaire and described teacher perceptions regarding the following factors: achievement, advancement, recognition, responsibility, the work itself, supervision, salary, interpersonal relations, policy and administration, and working conditions.

The Brayfield-Rothe "Job Satisfaction Index," as modified by Warner (1973), was used to measure job satisfaction when all facets of the job were considered. This index constituted Part II of the questionnaire. Part III of the questionnaire consisted of demographic variables.

Validity was established for the questionnaire by employing a panel of experts to establish content and face validity. The panel of experts consisted of teacher educators, teachers of agriculture, and graduate students. Reliability was established by pilot testing the questionnaire using a group of teachers which were not selected for the study. The reliability coefficient for the questionnaire was .89.

DATA COLLECTION

To collect the data, post cards announcing the forthcoming questionnaire package were mailed five days prior to the mailing of the complete questionnaire package. Follow-up consisted of a post card sent to non-respondents ten days after the mailing of the initial questionnaire package. A second complete questionnaire package consisting of a cover letter, questionnaire, and return envelope was mailed to non-respondents seven days after the first follow-up post card. A final follow-up post card was sent five days after the mailing of the second complete package. There was an 81% response rate. Non-response error was controlled by comparing early to late respondents (Miller & Smith, 1983), which yielded no significant difference.

ANALYSIS OF DATA

All data were analyzed using the Statistical Package for the Social Sciences, Personal Computer version (SPSS^{x}PC). Descriptive statistics were utilized to portray the teachers of agriculture. Various types of relationships were described and the statistics used to describe those relationships were calculated based upon the levels of measurement of the variables involved.

RESULTS

The mean age for the teachers in this study was 40 years and the majority of the teachers had obtained at least a Bachelor's degree. Of the teachers in the study, 55% were tenured and had a mean of 13 years teaching with a mean of 10 years in the current teaching position. The teachers reported the following mean scores on the job satisfier and dissatisfier factors (based on a six point Lickert-type scale, 1 = very dissatisfied; 6 = very satisfied): achievement, 4.48; advancement, 4.18; interpersonal relationships, 4.90; policy and administration, 4.09; recognition, 4.32; responsibility, 4.69; salary, 4.11; supervision, 4.08; the work itself, 4.64; and work conditions, 4.10.

Table 1

Means and Standard Deviations for Job Satisfactier and Job Dissatisfactier Factors

(n = 414)

Job Satisfier	$\bar{x}$	SD
Achievement	4.48	.72
Advancement	4.18	.90
Recognition	4.32	1.04
Responsibility	4.69	.85
The Work Itself	4.64	.88
Job Dissatisfier		
Interpersonal Relationships	4.90	.65
Policy & Administration	4.09	1.08
Salary	4.11	1.26
Supervision/Technical	4.08	1.32
Working Conditions	4.10	.92

The correlation coefficients between the agriculture teachers' level of job satisfaction and the selected demographic variables tended to be low (all correlation coefficients will be interpreted utilizing Davis' (1971) interpretations. The coefficients were: age, .09; years in current position, -.01; total years teaching, .01; degree status, .04; and, tenure status, .07 (Table 2).

Table 2

Relationship Between Job Satisfaction and Selected Variables
(n = 414)

Variable	r	Sig.
Age	.09	.18
Years in current position	-.01	.37
Total years teaching	.01	.37
Degree status	.04	.34
Tenure status	.07	.29

The relationship between selected job satisfier factors and job satisfaction were as follows (Table 3): achievement, -.15; advancement, -.12; recognition, -.08; responsibility, -.13; and work itself, -.16. The relationship between achievement and work itself and job satisfaction was significant.

Table 3

Relationship Between Job Satisfaction and Job Satisfier Factors
(n = 414)

Job Satisfier	r	Sig.
Achievement	-.15	.01
Advancement	-.12	.07
Recognition	-.08	.08
Responsibility	-.13	.08
The Work Itself	-.16	.01

The relationship between selected job dissatisfier factors and job satisfaction were as follows: interpersonal relationships, -.19; policy and administration, -.14; salary, -.01; supervision, -.12; and work conditions, -.13 (Table 4). The relationship between interpersonal relationships and job satisfaction was significant.

Table 4

Relationship Between Job Satisfaction and Job Dissatisfion Factors
(n = 414)

Job Dissatisfiers	r	Sig.
Interpersonal Relationships	-.19	.01
Policy and Administration	-.14	.07
Salary	-.01	.13
Supervision	-.12	.09
Work Conditions	-.13	.08

CONCLUSIONS AND/OR RECOMMENDATIONS

The secondary teachers of agriculture in Ohio are satisfied with their jobs. It is recommended that teachers of agriculture use the questionnaire used in this study to make self-evaluations and determine which facets of their positions are satisfying and dissatisfying. The findings of this study can serve as a norm for the teachers to make comparisons and request activities needed for professional growth and advancement.

The teacher's age, years of teaching, years in current position, degree status, and tenure status are not related to job satisfaction. The profession of teaching agriculture in the secondary schools should alert teachers that the selected demographic characteristics are not related to job satisfaction and when the teachers become dissatisfied with their jobs, the teachers should look elsewhere for possible reasons for the dissatisfaction.

The relationship between job satisfaction and job satisfier and job dissatisfier factors yielded significant correlation coefficients which indidcated that in the population of agriculture teachers in Ohio, job satisfaction and achievement, the work itself, and interpersonal relationships were correlated. Coefficients of .15 to .19 indicated a relationship of low magnitude.

The satisfier factors were not more related to job satisfaction than the dissatisfier factors as has been hypothesized in the literature. Also, contrary to what has been the thought, salary was least correlated with job satisfaction.

For the job satisfier and dissatisfier factors, the teachers ranked supervision as the least satisfying. The most satisfying factor of their job was ranked as the interpersonal relationships. Almost as satisfying are the tasks the teachers perform (the work itself). State supervisors, public school supervisors, and teacher educators should be alerted that the teachers ranked supervision as the least satisfying. Persons who conduct supervisory duties upon the teachers should review the methods and procedures used in supervision to see if the process can be made more satisfying for the teachers.

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JOB SATISFACTION OF TEACHERS OF AGRICULTURE

A Critique

Jerry L. Peters, Purdue University--Discussant

The purpose of this study was to determine overall satisfaction and specific factors causing job satisfaction and job dissatisfaction among Ohio secondary agriculture teachers. Four research questions were developed to guide the investigation. The research design was appropriate for the problem and research questions posed. The researcher established the validity and reliability of the instrument used in the study. The researcher is to be commended on the effort given to improve response rate. The summary data were presented in a concise manner, and statistical analysis techniques were appropriate, given the nature of the data and the objectives of the study.

The introduction of the paper could be improved by citing additional research findings that focus on factors affecting job dissatisfaction. The instrumentation section of the paper was also lacking in depth. A more detailed description of the instruments used to develop the questionnaire for this study was needed.

I found the results section of the paper to be somewhat confusing. What section/part of the questionnaire used the Lickert-type scale? There was no indication in the results section on the findings from the Brayfield-Rothe "Job Satisfaction Index" used in the questionnaire.

The conclusions should be more carefully written. As stated earlier one of the purposes of this study was to determine factors causing job satisfaction and job dissatisfaction yet this is not addressed in the conclusions. It should also be noted that recommendations for further research are not included in this paper.

The final paragraph of conclusions was somewhat unclear as to the logical connection between the teachers ranking of supervision as the least satisfying part of their job and the way persons who conduct supervisory duties upon the teachers.

IMPACT OF PERSONAL LIFE FACTORS ON THE EFFECTIVENESS AND SATISFACTION OF TEACHERS

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INTRODUCTION

Educational programs that produce students who strive to become self-actualized have teachers who are highly driven with a strong sense of purpose. Therefore, the quality of the education being delivered is a function of the level of job satisfaction (Bowen, 1981) and the effectiveness of teachers (Miller, Kahler & Rheault, 1989). Because the performance of agricultural teachers is important to the success of agricultural education programs, factors that influence teacher effectiveness and satisfaction must be identified. Consequently, several important questions must be asked. What factors influence the satisfaction and effectiveness of secondary agricultural education instructors? What conditions must exist for teachers to be more satisfied and effective? How satisfied and effective are teachers?

Many current research efforts attempt to relate job satisfaction to extrinsic factors such as increased salaries, investment in the profession, and improved teaching status. The most common hypothesis being tested is that such factors have a direct impact on the job satisfaction of the teacher which indirectly leads to a more effective educator.

Satisfaction derived from teaching, marital status, and teaching fulfillment are defined as personal intrinsic factors. These factors are rarely considered as important elements affecting a teacher's professional role enactment (Pajak & Blase, 1989). Additional research by Rusbult and Farrell (1983) suggested that job commitment is a multi-faceted phenomenon too complex to be explained by knowing only an individual's level of job satisfaction.

According to Pittman and Orthner (1988), the potential for conflict between work and family roles is great among employed persons. Conflict arises when individuals seek to differentiate between personal and professional roles. Unresolved intrinsic and extrinsic factors lead to job dissatisfaction. From an educational perspective, this disruptive relationship between a teacher's personal and professional life is defined as role conflict (Burden, 1982). Hange (1982) found that child care and occupational demands of teachers are often in conflict. In addition, Freedman, Jackson, and Boles (1983) found that high demands in the workplace lead to personal role conflict. Others researchers, however, have found that personal and professional roles can be complementary. Zimmerman, Skinner, and Birner (1980) reported that married home economics teachers were more satisfied with their jobs than unmarried teachers. Lightfoot (1983) found that female teachers were more effective than male teachers in integrating domestic and professional roles. Krupt (1986) found that teachers with children were more tolerant and understanding of their students than teachers without children.

In 1989 Pajak and Blase conducted a qualitative study of the impact of teachers' personal lives on their jobs. They identified 13 personal life factors that positively and negatively affected teachers' professional performance. Pajak and Blase (1989) found that teachers perceived aspects of their personal lives to positively influence their professional lives. Teachers indicated that personal life factors tended to have beneficial effects on their ability to relate and change student behavior. Teachers perceived that aspects of interpersonal relationships such as parenting and marriage had both positive and negative effects on their professional role enactment. These interpersonal relationships lead to feelings of guilt, fatigue, and frustration by some teachers , while feelings of caring, compassion, and dedication were viewed by some teachers as important attributes of marriage and parenting. Ultimately, teachers perceived that a multidimensional definition of "self" enriched their performance on the job (Pajak & Blase, 1989).

PURPOSE AND OBJECTIVES

The purpose of this study was to determine if the factors identified by Pajak and Blase (1989) can be used to explain the effectiveness and job satisfaction of secondary agricultural instructors. The study had two objectives:

1. To determine if the Pajak and Blase (1989) personal life factors can explain the effectiveness of secondary agricultural education teachers.
2. To determine if the Pajak and Blase (1989) personal life factors can explain the job satisfaction of secondary agricultural education teachers.

PROCEDURES

The population for the study consisted of all secondary agricultural education teachers in the United States. A stratified random sample was chosen for the study. Eight states, two from each AATEA region, were randomly selected for the study. Next, 363 teachers were randomly selected to reflect a 5% margin of error (Krejcie & Morgan, 1970).

An instrument was developed which consisted of three scales to measure teacher effectiveness, job satisfaction, and the Pajak and Blase personal life factors. The scales were developed from other instruments with predicted high content validity and reliability. A panel of five faculty and graduate students in the Department of Agricultural and Extension Education at The Pennsylvania State University judged the instrument to have the necessary content and face validity. The instrument was then pilot tested with 30 teachers not chosen for the sample. The effectiveness scale consisted of 37 items measured on a 5-point Likert type scale. This scale was found to have a Cronbach's alpha reliability of .82. The Brayfield-Rothe Job Satisfaction Index (1951) as modified by Warner (1973) was used to measure job satisfaction. The index was found to have a Cronbach's alpha reliability of .85. The Pajak and Blase personal life factors were measured on an 11-point scale which sought to differentiate teachers' negative and positive responses to 10 items. This scale had a Cronbach's alpha reliability of .85.

The data were collected using the self-administered instrument over a 9-week period during the spring 1990. An initial and three follow-up mailings yielded 279 usable responses (an 81% return rate). Early and late respondents were compared and found to be not significantly different ($p \geq .05$) on teacher effectiveness, job satisfaction, and sociodemographic characteristics (Miller & Smith, 1983).

The data were analyzed using the Statistical Package for the Social Sciences (SPSS^{X}). Descriptive statistics and stepwise multiple regression were used to analyze the data. The .05 alpha level was used in the study.

RESULTS

The mean age for the sample was 38 years. Slightly over 90% of the teachers were males. Over 87% were married and 76% had children. Nearly 49% of the teachers have a master's degree. These findings are in contrast with the Pajak and Blase (1989) study which found that 67% of the teachers were female, 76% were married and 65% had children. Agricultural educators reported 12 years of teaching experience, while the Pajak and Blase sample had 9 years of teaching experience. More than 37% of the agricultural education teachers reported having another job in addition to teaching. Teachers who had a job other than teaching spent an average of 16 hours a week during the school year and almost 30 hours a week during the summer employed in those jobs. Over 55% of the agricultural education respondents indicated that they have 11 or 12 month teaching contracts.

As shown in Table 1, teachers in the Pajak and Blase (1989) study were ranked from one to ten (high to low) on positive factors (negative factors were compared in a similar way). These positive and negative rankings were "paired" to the agricultural teacher's positive/negative rankings. As seen in the table, being a parent and being married had the most positive impact on the performance of teachers in general. Agricultural education teachers in this study ranked their fulfillment from teaching and satisfaction from teaching as being most influential. Conversely, in the Pajak and Blase study, being a parent and fulfillment from teaching had the most negative influence. However, agricultural education teachers indicated their financial situation and being married had the most negative influence on their performance as teachers.

Table 1

Comparisons of Personal Life Factors That Impact the Lives of Teachers in General and Secondary Agricultural Education Teachers

Life Factor	Ranking of Positive Factors*		Ranking of Negative Factors*	
	Pajak/Blase**	Ag Ed**	Pajak/Blase**	Ag Ed**
Parenting	1	8	1	3
Marriage	2	10	3	2
Teaching Satisfaction	3	2	9	5
Teaching Fulfillment	4	1	1	6
Spiritual Belief	5	7	7	8
Experiences Outside Teaching	6	3	9	10
Influence of Family & Friends	7	6	3	9
Financial Situation	8	9	7	1
Sound Health	9	4	6	4
Community Visibility	10	5	3	7

* Factors ranked from most to least positive and most to least negative

** No agreement ($p > .05$) between rankings for pairs of positive and negative factors $r_s = -.13$ (positive factors); $r_s = .18$ (negative factors)

Table 2 presents Pearson product moment correlation coefficients between the personal life factors and teacher effectiveness. Statistically significant, positive relationships were found between the dependent variable, teacher effectiveness, and all personal life factors except teaching fulfillment and parenting.

Insert Table 2 About Here

Table 3 presents Pearson product moment correlation coefficients between the personal life factors and teacher satisfaction. Statistically significant, positive relationships were found between the dependent variable, teacher satisfaction, and all personal life factors except the relationships between teaching satisfaction and parenting, marriage, and spiritual beliefs. Also, no statistical significance was between parenting and teaching fulfillment.

Insert Table 3 About Here

Two stepwise regression models were developed to assess the influence of the Pajak and Blase (1989) personal life factors on the effectiveness and job satisfaction of secondary agricultural education teachers. As shown in Table 4, the stepwise multiple regression model yielded two variables that explained 22% of the variance in teacher effectiveness. This analysis indicated that satisfaction derived from teaching was the best indicator of teacher effectiveness. Teacher effectiveness increased as satisfaction derived from teaching increased. Likewise, as positive personal experiences outside of teaching increased so did teacher effectiveness. Collectively they explained almost 22% of the variation in effectiveness.

Table 4

Stepwise Regression of Teacher Effectiveness on Personal Life factors

Variable	Multiple R	R^2	Beta	F
Satisfaction derived from teaching	.47	.19	.37	38.12***
Personal experiences outside of teaching	.51	.22	.21	11.56***

*** For Model: F = 33.60(2,232); only factors explaining significant amount of variance ($p < .05$) included in the Model.

Table 5 presents the stepwise multiple regression model for job satisfaction. This model yielded two variables that explained 36% of the variance in job satisfaction. This analysis indicated that personal fulfillment derived from teaching was the best indicator of job satisfaction. Job satisfaction rates increased as teachers received more personal fulfillment and satisfaction from their jobs.

Table 5

Stepwise Multiple Regression of Teacher Satisfaction on Personal Life factors

Variable	Multiple R	R^2	Beta	F
Personal fulfillment derived from teaching	.58	.33	.42	34.44***
Satisfaction derived from teaching	.60	.36	.22	9.07**

*** For Model: F = 68.2(2,246); only factors explaining significant amount of variance ($p < .05$) included in the Model.

Table 2
Interrelationships Among Selected Variables and Teacher Effectiveness

	E	P	TS	M	FS	TF	SB	CV	IFF	OT	SH
Effectiveness (E)	-	.17	.43	.22	.21	.38	.21	.25	.19	.31	.25
Parenting (P)		-	.13	.42	.14	.10*	.17	.17	.23	.20	.14
Teaching Satisfaction (TS)			-	.18	.18	.71	.21	.18	.16	.29	.22
Marriage (M)				-	.31	.27	.36	.29	.45	.29	.29
Financial Situation (FS)					-	.31	.18	.29	.32	.26	.25
Teaching Fulfillment (TF)						-	.34	.29	.32	.31	.24
Spiritual Beliefs (SB)							-	.40	.46	.35	.34
Community Visibility (CV)								-	.60	.45	.40
Influence Fam. & Friends (IFF)									-	.40	.33
Exp. Outside Teaching (OT)										-	.56
Sound Health (SH)											-

(n = 235; all coefficients are less than $p < .05$) unless indicated (*)

Table 3
Interrelationships Among Selected Variables and Job Satisfaction

	S	P	TS	M	PFS	TF	SB	CV	IFF	OT	SH
Satisfaction (S)	-	.06*	.52	.10*	.14	.58	.08*	.24	.15	.23	.15
Parenting (P)		-	.13	.44	.12	.10*	.18	.17	.26	.19	.14
Teaching Satisfaction (TS)			-	.18	.15	.71	.21	.20	.14	.28	.23
Marriage (M)				-	.33	.26	.38	.30	.44	.30	.31
Financial Situation (PFS)					-	.28	.18	.29	.34	.28	.24
Teaching Fulfillment (TF)						-	.31	.30	.29	.31	.23
Spiritual Beliefs (SB)							-	.40	.42	.32	.37
Community Visibility (CV)								-	.58	.43	.42
Influence Fam. & Friends (IFF)									-	.36	.31
Exp. Outside Teaching (OT)										-	.52
Sound Health (SH)											-

(n = 249; all coefficients are less than $p < .05$) unless indicated (*)

CONCLUSIONS

Three conclusions were made based on the findings:

1. The personal life factors tended to positively and negatively influence the performance of secondary agricultural education teachers differently from those observed for teachers in the Pajak and Blase (1989) study. Agriculture teachers indicated that financial rewards of teaching were a negative aspect of the profession. This finding is in sharp contrast to data reported by Pajak and Blase (1989). Further, while teaching fulfillment was the highest ranking positive factor indicated by agricultural educators, it was the highest ranked negative factor found by Pajak and Blase (1989). A similar contradiction was found with life factor parenting. In this study parenting was the highest ranking negative factor, while Pajak and Blase found parenting to be the highest ranking positive factor for teachers in general. The different rankings between the two teacher groups might be explained by differences in gender, marital status, and parental roles..
2. The effectiveness of secondary agricultural education teachers was best explained by the satisfaction the teachers derived from teaching. Agriculture teachers who are satisfied with their positions and careers are more effective as classroom teachers. The research supports Bowen's (1981) contention that the quality of the education being delivered is a function of the level of job satisfaction of the teachers.
3. How satisfied the secondary agricultural education teachers were with their jobs was best explained by the fulfillment the teachers received from teaching and the satisfaction they derived from teaching.

RECOMMENDATIONS

Three recommendations were made based on the findings:

1. Teacher educators, state supervisors, and secondary principals should recognize and emphasize personal life factors that appear to make teachers and potential teachers feel positive about the job they are doing in the classroom. Professional educators on all levels should exude the personal rewards of teaching to prospective students.
2. Agricultural education professionals should review the findings and implement programs and activities to enhance factors that the teachers perceive to be positively impacting their performance. Strategies should be developed to teach beginning teachers how to recognize the importance of teacher fulfillment and self-satisfaction.
3. Additional research is needed to examine how being married and a parent are negatively influencing the the self-perceived performance of secondary agricultural education teachers.

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IMPACT OF PERSONAL LIFE FACTORS ON THE EFFECTIVENESS AND SATISFACTION OF TEACHERS

A Critique

Jerry L. Peters, Purdue University--Discussant

This paper begins with a rather detailed discussion of research related to the job satisfaction of teachers. The researchers build a very good case for using the factors identified by Pajak and Blase (1989) to explain the effectiveness and job satisfaction of secondary agriculture instructors.

The procedures section was helpful, detailing the selection of the population and describing appropriate checks on reliability and validity of the instrument as the researchers controlled for measurement error. The researchers utilized and built upon research conducted by others in developing the research instrument. It would be helpful to those who wish to replicate the study if the researchers would identify any follow-up procedures used for the non-respondents and address non-response error.

Statistical procedures employed to analyze the data collected were appropriate to accomplish the objectives of the study. The data was logically arranged and clearly presented in the tables.

A review of the last section of the paper raised a concern about the conclusions and the purpose of the study. Based upon the findings of this study can the factors identified by Pajak and Blase be used to explain the effectiveness and job satisfaction of secondary agriculture instructors? This question was not completely addressed.

In addition, it appeared that the personal life factors identified by teachers in the Pajak and Blase study were not in agreement with the secondary agriculture teachers. If this is indeed true then can the results justify recommendation one? For the integrity of this paper, the recommendations should be carefully edited to reflect the information presented in the findings of this paper.

EFFECTS OF SPOUSAL SATISFACTION ON JOB SATISFACTION OF EXTENSION AGENTS

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INTRODUCTION

Louisiana Cooperative Extension Service (LCES) work with local clientele to deliver programs based on the needs of individuals and businesses. These needs put a large demand on the extension worker's time. The time spent at work beyond normal business hours means time spent away from the family. This is a concern because it affects the work-family relationship and has been acknowledged by the Extension Committee on Policy (ECOP) at the federal and state levels (1981).

The effect of one's job responsibilities upon the family is known as the work-family relationship. The ECOP Task Force on Families stressed the need to reduce the high organizational cost of turnover and to critically examine policies and practices in relation to their effects upon the family life of Extension employees. This report concluded that renewed efforts to recognize and be attentive to human and family needs of Extension workers at all levels will result in improved job satisfaction, increased productivity, and continued programming effectiveness among the workers who have made Extension the world's best informal educational system (Extension Committee on Policy, 1981.)

In an Idaho study, Church and Pals (1982) found that Extension agents who had resigned most frequently cited the evening and weekend work as their reason for resigning. This reasons for resigning is just one of many possible reasons for resigning. Another reason is the absorptiveness of the job. Highly absorptive jobs require a great amount of time commitment and involvement by the agent (Kanter, 1977). This influences the quality of the family life of Extension agents because Extension work has been confirmed as a highly absorptive occupation (St. Pierre, 1984). Human contact occupations, such as extension work, have potential to influence family life more than other occupations. According to St. Pierre (1984), extension agents perceive their jobs to affect their lives more negatively than positively. Also, the perception a spouse has of a person's spouse's job can greatly influence their job satisfaction. This could affect job performance and productivity in a positive or negative way.

Researchers have studied the variables that affect job satisfaction, including morale, burnout, and the perception that people have of their jobs. (Church & Pals, 1982; Kanter, 1977; Marshal, 1987; St. Pierre, 1984). However, these studies did not focus on the question of how spouses can affect the job satisfaction of their mate. Little is known about the effect that county extension work has on family life, especially spouses, and conversely, the effect that spouse's opinions have on the agent's job satisfaction.

PURPOSE AND OBJECTIVES

The purpose was to determine if the Louisiana Cooperative Extension Service agents' spouses' satisfaction with the agents' job had an impact on the job satisfaction of extension agents. The objectives were to:

1) Determine the spouses' satisfaction with the extension agent's job.

2) Determine if any relationships existed between selected variables and the spousal satisfaction score (SSS).

3) Determine the job satisfaction level of LCES agents as measured by the Minnesota Satisfaction Questionnaire (MSQ).

4) Determine if selected variables explain a significant proportion of the variance in the general job satisfaction level of LCES agents as measured by the short form of the Minnesota Satisfaction Questionnaire (MSQ).

5) Determine what variables explain the variance in spousal satisfaction scores as measured by the spousal satisfaction scale.

METHODOLOGY

Population and Sample. The population consisted of the 229 extension field agents employed for two or more years by LCES, and their spouses. Using Cochran's sample size formula, the minimum sample size needed was 92. A simple random sample size of 152 was used to accommodate any refusals or frame errors.

Instrumentation. Three instruments were used. Instrument "A" (Perceptions of the LCES by Extension Agent's Spouse), was administered to extension agents' spouses and contained demographic questions and the spousal satisfaction scale. The content of this scale was developed after a review of the literature, including instruments developed by St. Pierre (1984) and Schultz (1986). The instrument measured the spouse's satisfaction with the extension agents job. The scale consisted of 16 questions related to the spouses' satisfaction with the LCES. Possible responses ranged from very dissatisfied (1) to very satisfied (5). Two instruments were administered to the agents. The Agent Profile Instrument (Perceptions of the LCES by Extension Agents), Instrument "B", and the MSQ, Instrument "C". The Agent Profile instrument consisted of questions developed after the review of literature. The MSQ was used to measure job satisfaction of the agents. Possible responses on the MSQ ranged from very dissatisfied (1) to very satisfied (5). Content validity of instruments "A", "B" and "C" were assessed by a panel consisting of graduate students, faculty, extension agents, and extension agents' spouses. The panel indicated that the instruments possessed content validity. Cronbach's alpha was used to measure the internal consistency of the spousal satisfaction scale and the MSQ.

Data Collection. Two mailouts were used to collect data. When one member of the couple responded (either the agent or the spouse) but the other did not, all non-respondents (either agents or spouses) were contacted by phone and asked to respond. For the 11 cases where neither member of the couple responded, all non-respondents (both agents and their spouses) were contacted by phone to determine if the non-respondents were different from the respondents. Of the 152 agents and their spouses, 127 (83.6%) completed and returned their surveys.

Data Analysis. Two inferential *t*-tests revealed that no differences existed between the agents' job satisfaction scores and the spousal satisfaction scores by response mode - mail and phone, the data were combined for analysis. Spousal satisfaction scores (objective 1) and agent job satisfaction scores (objective 3) were analyzed using descriptive statistics. The relationships between selected variables and the spousal satisfaction score (objective 2) were analyzed using Pearson and Spearman Rho correlations. The correlations were interpreted according to the descriptors proposed by Hinkle, Wiersma, and Jurs (1979). Stepwise multiple regression was used to determine which factors explained the variance in job satisfaction scores of agents (objective 4) and spousal satisfaction scores (objective 5). The alpha level was set a priori at .05.

FINDINGS

Description of the Sample. The mean age of the spouses was 41.22 years and the average age of the agents was 41.62 years. There were 39 (30.7%) female agent respondents and 88 (69.3%) male agent respondents. Most of the responding couples (120 or 94.5%) indicated they were white while seven (5.5%) were black, 116 (91.3%) had children and 11 (8.7%) had no children, and 63 (57.5%) had at least one child under 12 years old living at home. Most (107 or 84.3%) of the spouses worked for wages/salary outside of the home and only 19 indicated they did not work for wages/salary outside of the home. Over two-thirds (90 or 70.9%) of the spouses worked full-time while 17 (13.4%) had part-time jobs. All of the spouses had a minimum of a high school education. Nearly two-thirds had earned either an undergraduate degree (49 or 38.6%) or a graduate degree (28 or 22%).

The agents had worked an average of 15.34 years for the LCES and most (117 or 92.10%) reported working over 40 hours per week while one-fourth (32 or 25.3%) worked over 50 hours per week and 20 (15.8%) reported working 60 or more hours per week. The agents spent an average of 1.92 nights away from home each month. Agents averaged 1.58 nights away from home per week during the family dinner hour. Almost half (59 or 46.46%) indicated they worked primarily in the area of agriculture and thirty-six (28.35%) of the agents were responsible for the 4-H Club program. In addition, 23 agents (18.11%) spent most of their time working with the adult home economics area. Nine of the agents were responsible for areas other than agriculture, 4-H, and home economics. These areas were fisheries, rural/community development and special projects.

Objective 1--Spousal Satisfaction Score of LCES Agents' Spouses. Table 1 presents the responses to the questions that comprised the Spousal Satisfaction Scale. A Cronbach's alpha reliability coefficient of .89 was calculated for the scale. Table 2 indicates a mean score of 53.40 for all respondents (agriculture agent's spouses - M = 56.98, Four-H agent's spouses - M = 46.53, home economists spouses - M = 55.57). Over one-half of the spouses were neither satisfied nor dissatisfied with the agent's job while over one-third (51 or 40.16%) of the spouses were satisfied.

Objective 2--Factors Related to Spousal Satisfaction. The second objective was to determine if any relationships existed between selected variables and the Spousal Satisfaction Score. The data were analyzed using Pearson and Spearman Rho correlations. The agents' general job satisfaction, was moderately correlated with the Spousal Satisfaction Score (r = .59). As the agents' general job satisfaction increased, the spouses' satisfaction with the agents' job also increased. Two other variables, whether the agent was a 4-H agent or an agriculture agent, had a low level of correlation with the Spousal Satisfaction Score (r_s = -.42 and r_s = .33 respectively). Spouses of Four-H agents had lower levels of spousal satisfaction than spouses of other types of agents. The other variables studied had little, if any, correlation with the Spousal Satisfaction Score (Table 3).

Objective 3--Job Satisfaction of Cooperative Extension Service Agents. Objective three was designed to secure information on the level of job satisfaction of LCES agents as measured by the MSQ. The questionnaire measured agents' general, intrinsic, and extrinsic job satisfaction. Raw scores for each MSQ scale (intrinsic, extrinsic, and general satisfaction) were converted to percentile scores using the normative data for "Professional, Technical, and Managerial Engineers." A percentile score of 75 or higher was interpreted as a high degree of satisfaction; a percentile score of 25 or lower represented a low level of satisfaction and scores in the middle range of percentiles (26 to 74) indicated average satisfaction (Weiss, *et al*., 1967). A Cronbach's alpha reliability coefficient of .86 was calculated for the scale.

Results indicate that extension agents have a general satisfaction mean score of 75.42 on a scale that ranged from 20 to 100. When scores were compared to the norm group, extension agents general job satisfaction level was at the

35th percentile, indicating a moderate level of satisfaction. Scores from the respondents ranged from a low of 47 to a high of 96.

The mean intrinsic satisfaction score was 50.10 on a scale that ranged from 12 to 60. When this score was compared to the norm group it revealed that the mean intrinsic satisfaction score fell at the 56th percentile indicating a moderate level of intrinsic satisfaction among extension agents. The mean extrinsic satisfaction score was 18.10 on a scale that ranged from 6 to 30. When the mean score was compared to the norm group it revealed that the mean extrinsic satisfaction score fell at the 25th percentile indicating a low level of extrinsic satisfaction among extension agents.

Objective 4--Multiple Regression Analysis of Job Satisfaction Scores. The fourth objective was to determine if selected variables explained a significant proportion of the variance in the general job satisfaction of LCES agents as measured by the short form of the MSQ. A variable was included in the final explanatory model if it explained one percent or more of variance in addition to the variance already explained by other variables in the model. The variables used in this analysis are in Table 3. The results of the analysis are in Table 4.

The strongest predictor of job satisfaction of LCES agents was the Spousal Satisfaction Score. It was responsible for explaining 35% of the agent job satisfaction score. This finding has great importance because it shows that the spouse's satisfaction with the agent's job explains a large percentage of the variance in the agent's satisfaction with the job. Ogden (1978) implied that if an employee's spouse is unhappy at home, this will have negative effects on what the employee does at work. The more dissatisfied the employee's spouse is, the more it is going to distract the employee from the job. Consequently, an agent whose spouse is satisfied with the agent's job is more likely to feel the same toward his/her job.

An agent, whose major area of responsibility is 4-H youth work, was found to be the second strongest predictor of agent job satisfaction. This variable explained an additional 3.5% of the agent's job satisfaction score. Four-H agents had lower levels of job satisfaction than other agents. In his study of LCES 4-H agents, Marshal (1987) revealed that 4-H agents had a low level of general job satisfaction. St. Pierre (1984), noted that Four-H agents perceived their jobs to be significantly more absorptive than other agent types mainly because of the timing of the youth agents' work (evenings and weekends).

Objective 5--Multiple Regression Analysis of the Spousal Satisfaction Score. The fifth objective was to determine what variables explain the variance in spousal satisfaction scores as measured by the spousal satisfaction scale. Four variables explained a significant amount of the variance in spousal satisfaction. These variables were the extrinsic satisfaction of the agent agents ($\underline{R}^2 = .398$), responsibility for 4-H youth work (additional $\underline{R}^2 = .039$), the hours the agent works each week (additional $\underline{R}^2 = .018$), and the years the agent has been employed by the LCES (additional $\underline{R}^2 = .012$) (Table 5).

CONCLUSIONS, AND RECOMMENDATIONS

1. Spousal satisfaction accounts for 35% of the variance in the job satisfaction scores of agents. Almost one-half of the spouses (48.03%) were neither satisfied nor dissatisfied with the agent's job. Since it appears that spousal satisfaction helps to explain agent's job satisfaction, it is recommended that the LCES consider implementing programs to increase the satisfaction levels of agents' spouses. As an example, the LCES may wish to implement a spousal orientation program for the spouses of new agents.

2. Four-H agents' spouses have lower levels of spousal satisfaction than other types of agent (M = 46.53). The regression analysis of agents' job satisfaction scores revealed that whether an agent was a Four-H agent was a significant explanatory factor in the analysis of agents job satisfaction. The regression analysis of spousal satisfaction scores revealed that hours worked was a significant explanatory factor in the analysis of spousal satisfaction. Since the nature of the Four-H agents job requires the agent to work long and irregular hours, the problem of low levels of spousal satisfaction possessed by Four-H agents' spouses may not have a solution. However, it is recommended that further study be conducted to verify this finding. If this finding is confirmed by further research, the LCES should attempt to determine if a feasible way of alleviating this problem exists.

3. LCES agents had low extrinsic job satisfaction scores. It is recommended that the LCES focus attention on improving the status of those factors that make up extrinsic job satisfaction. These factors are recognition received, chances for advancement, salary, "company" policies, and decision making.

4. Spouses are least satisfied with the agents salary, stress level and the number of hours worked by the agent each week. The number of hours the agent works as opposed to the salary received may create stress on the job which adversely affects spousal satisfaction. When possible, compensatory time or flex scheduling should be granted to agents working beyond the 40 hour work week.

5. Agents have a moderate level of job satisfaction. In order to improve spousal satisfaction with the extension agent's job, efforts need to be focused on improving agents' general job satisfaction. When possible, extrinsic factors should be addressed first because the extrinsic factors explained a large portion of the variance in spousal satisfaction. Agents also scored lowest in extrinsic job satisfaction.

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Table 1

Responses to the Spousal Satisfaction Questionnaire (N = 127)

Category	M	S.D.
How satisfied are you with:		
...the job security that your spouse has?	3.77	.99
...your spouse's present salary?	2.76	1.17
...the number of hours your spouse works each week?	2.77	1.11
...the amount of travel your spouse is required to do?	3.00	1.08
...the benefits your spouse receives from the LCES?	3.39	1.10
...your spouse's opportunities for advancement and promotion?	2.93	1.14
...the enjoyment you derive from your spouse's employment?	3.50	.96
...the way Extension work affects your family life?	3.13	1.11
...the work flexibility your spouse has with the in-office schedule?	3.90	.86
...your spouse's co-workers?	3.68	.98
...your spouse's satisfaction with his/her job?	3.51	1.11
...the LCES as a family oriented employer?	3.06	1.16
...stress level of spouse's job?	2.58	1.20
...the prestige you receive from your spouse's job?	3.47	.91
...the amount of vacation time available in your spouse's work?	3.95	.94
...the geographic location of your spouse's work?	4.00	1.00
Total	53.40	10.39

Note. Range = 16-80.

Table 2

Spousal Satisfaction Score

Score category	Interpretation	N	%
16.00 to 24.49	Very dissatisfied	1	.79
24.50 to 40.49	Dissatisfied	13	10.23
40.50 to 55.49	Neither satisfied nor dissatisfied	61	48.03
55.50 to 71.49	Satisfied	51	40.16
71.50 to 80.00	Very satisfied	1	.79
Total		127	100.00

Note. M = 53.40; SD = 10.39

Table 3

Pearson and Spearman Correlations Between Selected Variables and the Spousal Satisfaction Score

Category	Coefficient	p	Correlation
Agent job satisfaction	.59[a]	.001	Moderate
4-H agents	-.42[b]	.001	Low
Agriculture agents	.33[b]	.001	Low
Years agent employed	.28[a]	.001	Little, if any
Evenings worked	-.26[a]	.003	Little. if any
Hours worked per week	-.26[a]	.003	Little, if any
Family life cycle stage	-.18[a]	.046	Little, if any
Education of spouse	-.12[b]	.163	Little, if any
Difference in ages	.11[b]	.222	Little, if any
Home Economics agents	.11[b]	.234	Little, if any
Nights away from home	-.08[a]	.361	Little, if any
Spouse's employment	-.04[b]	.639	Little, if any
Gender of spouse	-.03[b]	.749	Little, if any
Race of agent and spouse	-.09[b]	.304	Little, if any

Note. N = 127
[a]Pearson Correlations; [b]Spearman Rho Correlations.

Table 4

Multiple Regression Analysis of Job Satisfaction Scores (N = 127)

Source of Variation	SS	df	MS	F	Prob. of F
Regression	4203.57	2	2101.78	39.34	.001
Residual	6625.31	124	53.43		
Total	10828.88	126	2155.21		

Variables in the equation

Variables	R^2	Cum. R^2	F	Prob. of F
Spousal satisfaction score	.353	.353	68.27	.001
Four-H agent	.035	.388	39.34	.001

Note. Variables that were not significant explanatory variables were: education level, evenings agent worked, nights away from home each month, whether agent was an agriculture or home economics agent, number of children living at home, and hours agent worked each week.

Table 5

Multiple Regression Analysis of Spousal Satisfaction Scores (N = 127)

Source of Variation	*SS*	*df*	*MS*	*F*	Prob. of *F*
Regression	6343.17	4	1585.79	26.69	.001
Residual	7249.35	122	59.42		
Total	13592.52	126	1645.21		

Variables in the equation

Variables	R^2	Cum. R^2	*F*	Prob. of *F*
Extrinsic satisfaction	.398	.398	82.49	.001
4-H agents	.039	.437	48.05	.001
Hours worked each week	.018	.455	34.18	.001
Years employed by LCES	.012	.467	26.69	.001

Note. Variables that were not significant explanatory variables were: spouse's education level, evenings worked by agent, nights away from home each month, agent's intrinsic satisfaction, whether agent was an agriculture agent or home economics agent, number of children living at home, and hours agent worked each week.

EFFECTS OF SPOUSAL SATISFACTION ON JOB SATISFACTION OF EXTENSION AGENTS

A Critique

Jerry L. Peters, Purdue University--Discussant

An extensive review of literature enabled the researchers to develop a sound theoretical framework for their study. The purpose and objectives of the study were written concisely. Appropriate procedures were followed in developing the instrumentation as the researchers controlled for measurement error. A strength of the study is the use and revision of previously developed instruments. The researchers were careful to establish content validity and reliability however the Cronbach's alpha score on the Spousal Satisfaction Scale was the only reliability score mentioned in the paper. What was the reliability score on the other two instruments?

The study was descriptive in nature. The researchers were careful not to statistically exceed their bounds and conducted an appropriate analysis of data. Presentation of data was enhanced as the tables were helpful to the reader in the interpretation of the data.

Conclusions and recommendations were based on the findings of the study and clearly stated. This study adds a new perspective on the development of programs to increase the satisfaction levels of extension agents. It would be helpful if the researchers identified other avenues of research based on the results of this study.

The researchers have demonstrated sound methods throughout data collection, evaluation, and interpretation. I commend them for an effort well done and challenge them to continue research efforts in this area. Congratulations to the authors for conducting a well organized study and for presenting a well written paper.

ATTITUDES, PERCEPTIONS, AND GUIDANCE PRACTICES OF ILLINOIS GUIDANCE DIRECTORS CONCERNING VOCATIONAL EDUCATION IN SECONDARY SCHOOLS

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INTRODUCTION

Educational reform reports such as A Nation at Risk have precipitated a deluge of support for increased graduation requirements, thereby restricting time for students to take vocational education (Frantz, Jr., Strickland, and Elson, 1987). In fact, a decrease in vocational education enrollments has been one of the most observable aftermaths of increased high school graduation requirements (Dyrenfurth, 1985). Availability and scheduling of vocational education courses also have been adversely affected by increasing graduation requirements, resulting in depressed enrollments. Frantz, Jr. et al. (1987) reported that many states have decreased their vocational course offerings. Also, vocational instruction has been relegated to shorter blocks of time (Fielden, 1987). As a result, limited access to vocational courses has been a major concern for college-bound students who may be interested in these offerings, as well as those who are interested in occupations requiring less than a baccalaureate degree (Association for Supervision and Curriculum Development, 1981).

Guidance counselors have had, and will continue to have, a vital role in providing the affective and operational support needed by vocational education programs. Internal marketing is essential, to assure that guidance counselors believe in the value of these programs and communicate this value to students (O'Conner and Trussel, 1987). Although some studies have identified attitudes of guidance counselors toward vocational education (Ricadela, 1981; Spillman, 1983), there has been a lack of research concerning perceptions of vocational education as related to increased graduation requirements and other factors which affect program accessibility. Furthermore, in view of shrinking vocational education enrollments, research has not adequately attended to guidance directors' guidance practices concerning vocational education. Therefore, the problem of this study was that vocational education is currently experiencing limited accessibility and declining enrollments, necessitating closer examination of the program support provided by guidance counselors.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to determine guidance directors' attitudes, perceptions, and guidance practices concerning vocational education in comprehensive secondary schools in Illinois. A secondary purpose was to investigate the relationships among these variables and selected school/personal demographic variables. More specifically, this study addressed the following research questions:

1. What were the attitudes of guidance directors in Illinois toward vocational education in comprehensive secondary schools?

2. What were the perceptions of guidance directors in Illinois concerning vocational education in their schools?

3. What were the perceptions of guidance directors in Illinois concerning the quality of vocational education programs offered in their schools in each of the major service areas?

4. What guidance practices concerning vocational education were guidance departments in Illinois comprehensive secondary schools currently following, as perceived by guidance directors?

5. To what extent did guidance directors differ in their attitudes, perceptions, and guidance practices concerning vocational education, based on selected demographic variables?

6. What was the relationship between guidance directors' departmental guidance practices concerning vocational education and their (a) attitudes toward vocational education and (b) perceptions of vocational education in their schools?

7. What variables were the best predictors of departmental guidance practices concerning vocational education in Illinois comprehensive secondary schools?

RELATED LITERATURE

Affective support by the school community, as expressed by attitudes toward vocational education and the perceived need for vocational education, has been deemed essential in maintaining quality, accessible programs (Speight, 1984/1985). Operational support by the school community also has been vital to program success. Course scheduling has been targeted as one such form of support which can allow accessibility to both academic and vocational courses (Lotto & Murphy, 1987). Curricular advisement by "significant others" such as guidance counselors has been of particular importance in assuring that vocational programs are serving those who will benefit most from their offerings (Hartman, 1986).

The related literature indicated that guidance counselors tend to have favorable attitudes toward vocational education (Ricadela, 1981; Spillman, 1983). However, the cumulative studies did not examine attitudes and guidance practices concerning vocational education in relation to current curriculum reform issues.

PROCEDURES

The research design utilized in this study was descriptive in nature. The target and accessible populations were all guidance directors in comprehensive public secondary schools in Illinois. The sample size of 253 was determined according to a formula developed by Cochran (1977). Proportionate stratified random sampling was used to determine the actual sample, with size of high school enrollment as the stratifying variable.

The questionnaire was a five-part instrument developed by the researcher. The researcher's graduate committee members and two faculty members in the Department of Educational Psychology and Guidance at Eastern Illinois University determined that the instrument possessed content validity.

A pilot test involving 22 randomly selected Illinois guidance directors was conducted to determine the reliability of the instrument. Since Likert scales were used for most of the items, with no distinction of correct or incorrect answers, Cronbach's coefficient alpha procedure was used to calculate the reliability estimates (Borg & Gall, 1983). Reliabilities determined from the pilot and sample data were consistent with guidelines established by Nunnally (1967). Therefore, Parts I through IV reflecting guidance directors' (a) attitudes toward vocational education, (b) perceptions of vocational education in their schools, (c) perceptions of the quality of vocational education programs in their schools in each of the major service areas, and (d) guidance practices concerning vocational education were treated as constructs in the statistical analyses.

Questionnaires were mailed to subjects on April 23, 1988; reminder postcards, on May 4th; and follow-up questionnaires, on May 14th. A random sample of nine (30%) of the non-respondents was telephoned on May 30th and June 1st to obtain their responses to the instrument.

ANALYSIS OF DATA

The data were analyzed according to the mainframe version of SAS. The information provided by the respondents concerning attitudes, perceptions, guidance practices, and demographic data were analyzed separately using frequency distributions, percentages, means, and standard deviations.

Analysis of variance, as calculated by the General Linear Model in SAS (PROC GLM), was used to determine whether there were significant differences among group means concerning attitudes, perceptions, and guidance practices, based on selected categorical demographic variables with three or more levels. A significance level of .05 was used in these statistical tests. The Tukey-Kramer method of multiple comparisons was used to ascertain whether significant differences existed among all possible pairwise comparisons. T-tests were utilized to determine whether there were significant differences in the dependent variable based on dichotomous demographic variables.

Correlational analyses were conducted to determine the relationships among attitudes, perceptions, guidance practices, and selected demographic variables. The Pearson correlation coefficient was used to draw relationships between the interval variables. The Spearman correlation coefficient was used to draw relationships between ordinal and interval variables.

Multiple regression analysis was used to determine the percentage of the variance in the dependent variable, guidance practices, that could be explained by a linear combination of the independent variables. The RSQUARE procedure was used to identify the combinations of predictor variables which explained the greatest amount of the total variance in guidance practices. Stepwise multiple regression, specifically the STEPWISE option of the STEPWISE procedure, was used to show the increment of unique variance added to the set of predictor variables by each successive predictor variable.

RESULTS

An instrument return rate of 88.5% was realized in this study. Of the 224 questionnaires returned, 222 were deemed usable and served as the basis for the findings. Since t-tests revealed no significant differences between the respondents and non-respondents on any items, the results obtained from the respondents were generalized to the sample and the target population.

Attitudes Toward Vocational Education in High Schools. Almost 93% of the respondents agreed that a comprehensive high school education should include some study in vocational education, while 88% agreed that vocational education courses are valuable for all students, regardless of their academic ability. Approximately one half (49%) of the responding guidance directors felt that vocational education coursework should be included in high school graduation requirements.

Although 70% of the respondents agreed that college-bound students should take vocational education, only 44% agreed that these courses provide college-bound students with competencies they will need to succeed in college. The mean for the construct "attitudes toward vocational education" was 3.63 on the 5-point scale (1 = STRONGLY DISAGREE, 5 = STRONGLY AGREE).

Perceptions of Vocational Education in Guidance Directors' Schools. Almost 90% of the responding guidance directors agreed that their vocational teachers are as effective in their teaching as academic teachers are. Eighty-four percent of the respondents agreed that students enrolled in vocational education are satisfied with these courses. However, only one half of the respondents felt that their school's vocational teachers are doing an adequate job of publicizing the benefits of their programs. Furthermore, almost 65% of the respondents felt that vocational and academic teachers do not collaborate to integrate academic subjects into vocational education courses in their high schools.

According to almost 60% of the respondents, parents of college-bound students are reluctant to have their children enroll in vocational education courses. Students have very little time to enroll in vocational education because of increased graduation requirements, as perceived by almost 75% of the responding guidance directors. The mean for the construct "perceptions of vocational education" was 3.30 on the 5-point scale (1 = SD, 5 = SA).

Perceptions of Vocational Education Program Quality by Major Service Area. With respect to agricultural education, responding guidance directors regarded the competency and preparation of teachers (4.01) and the quality of instruction (3.86) as "high" (1 = VERY LOW, 5 = VERY HIGH). According to respondents, agricultural education is of considerably more value to students who plan to work upon graduation (3.60) than to those who plan to attend college (3.03). The mean for the construct "overall program quality," consisting of all the items in a major service area, was considerably higher for business education (3.98) compared to agricultural education (3.49), home economics (3.44), and industrial education (3.41).

Guidance Practices Concerning Vocational Education in High Schools. Almost 99% of the respondents agreed that "if a noncollege-bound student expresses interest in a vocational course" or "if a student's career interest is related to a vocational offering in my high school," their guidance department tends to advise him/her to consider enrolling that course. Approximately 83% of the respondents indicated that, if a college-bound student expresses interest in a vocational course, their guidance department tends to advise him/her to consider enrolling in that course.

Ninety percent of the respondents agreed that increased graduation requirements do not affect their guidance department's tendency to advise noncollege-bound students to consider enrolling in vocational education courses, whereas only 58% agreed with this situation when college-bound students were involved. Similarly, 65% of the respondents indicated that, when scheduling conflicts with academic courses occur, their guidance department tends to advise noncollege-bound students to consider enrolling in vocational education courses. However, 60% of the respondents disclosed that their guidance departments do not tend to advise college-bound students to do so when scheduling conflicts occur. The mean for the construct "guidance practices concerning vocational education" was 3.74 on the 5-point scale (1 = SD, 5 = SA).

Differences in Attitudes, Perceptions, and Guidance Practices Based on Demographic Variables. Guidance directors with sons or daughters who have taken high school vocational education courses had (a) more positive attitudes toward vocational education and (b) more positive perceptions of vocational programs in their schools than did guidance directors without children enrolled in these courses

($p < .05$). Respondents who taught vocational education courses had more positive attitudes toward vocational education than did guidance directors who taught nonvocational courses ($p < .05$). Guidance practices regarding vocational education in schools requiring one or more vocational courses for graduation were significantly more positive than in schools in which these courses may be chosen from a group required for graduation (e.g., one course in vocational education or fine arts required) ($p < .05$).

Relationships Concerning Departmental Guidance Practices. Significant, positive relationships were observed between guidance directors' attitudes toward vocational education and departmental guidance practices ($r=.60$) and between their perceptions of vocational education in their schools and departmental guidance practices ($r = .42$).

Regression of Departmental Guidance Practices on Selected Independent Variables. A regression model with an R^2 value of .408 was obtained and included the following variables: attitudes toward vocational education, years as a guidance counselor, age of guidance director, and size of school. Guidance directors' attitudes toward vocational education (.373) accounted for almost all of the explained variance in departmental guidance practices (.408).

CONCLUSIONS

1. Guidance directors have generally positive attitudes toward vocational education in public high schools. Departmental guidance practices are substantially influenced by guidance directors' attitudes toward vocational education and their perceptions of program quality.

2. Guidance directors have generally divided perceptions of vocational education in their schools. While they feel instructional integrity and teacher competency are high in vocational education, they question the specific benefit of these programs to students, particularly those who are college-bound.

3. Departmental guidance practices in high schools are generally positive concerning vocational education, as perceived by guidance directors.

4. Guidance directors perceive that increased high school graduation requirements and parents' reluctance for their college-bound children to take vocational education have contributed to enrollment difficulties in these courses.

5. Increased graduation requirements and scheduling conflicts with academic courses have a considerably greater negative impact on guidance practices concerning vocational education when the focus is on college-bound students, as opposed to noncollege-bound students.

6. Enrollment of a son or daughter in vocational education courses has a positive influence on guidance directors' attitudes toward vocational education and perceptions of these programs in their schools of employment.

7. Experience in teaching vocational education courses has a positive impact on guidance directors' attitudes toward vocational education.

8. Guidance practices regarding vocational education in schools specifically requiring vocational education coursework for graduation are more positive than

in schools in which these courses may be chosen from a group required for graduation.

9. The more positive a guidance director's attitude toward vocational education and perception of vocational education in his/her school are, the more positive the departmental guidance practices concerning vocational education tend to be.

RECOMMENDATIONS FOR PROVIDING VOCATIONAL EDUCATION IN HIGH SCHOOLS

1. Vocational educators should increase communication with guidance counselors, parents, students, and school administrators to convey the importance of their updated, redirected programs.

2. Teachers in each major service area should pursue greater individualized interaction with guidance counselors regarding the nature of their vocational programs and course scheduling. In this study, guidance directors exposed to vocational education through their teaching or their children's involvement viewed vocational education more positively. This finding implies that guidance directors' familiarization with vocational education through other modes, particularly on a personal level, may have a positive influence on their attitudes toward this curriculum.

3. Vocational education leaders in Illinois should consider broadening the state's vocational education concepts of career preparation and occupational development in order to attract both college-bound and noncollege-bound students and to address curricular reform issues. Similarly, state leaders should consider modifying the state funding guidelines for vocational education as these occupational development concepts expand and as more non-traditional vocational education courses are offered.

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ATTITUDES, PERCEPTIONS, AND GUIDANCE PRACTICES OF ILLINOIS GUIDANCE DIRECTORS CONCERNING VOCATIONAL EDUCATION IN SECONDARY SCHOOLS

A Critique

Samuel M. Curtis, Penn State University--Discussant

This study examines the attitudes and perceptions of guidance counselors; then attempts to correlate these variables with guidance practices. The theoretical construct is that attitude and perception influences practice. Given this construct, one would then expect the review of literature to examine the research on the relationships between attitude and perception and practice. In actuality, the authors do not do this. Enrollment or lack thereof and the academic graduation requirements set the stage for the problem--declining enrollments in vocational education. The role of guidance counselors in vocational enrollments is then considered. Rightfully so. However, the declining numbers of total students over the time frame since increased graduation requirements went into effect is not mentioned. One could hypothesize that a) increased graduation requirements have decreased vocational enrollments and b) declining number of secondary students has resulted in declining vocational enrollments. One could even predict interaction. However, the study took a different direction. The results are interesting. Contrary to conventional wisdom, Illinois guidance counselors have favorable attitudes toward vocational education and advise students to enroll. The only possible negative aspect occurs when a scheduling crunch occurs for the college-bound student. When this occurs, the college-bound student is advised to take the academic course.

This study confirms that practice is indeed influenced by attitude and perceptions, except with some modification when another attitude appears to take precedence, i.e. a college-bound student should take academic courses.

Since the authors failed to define their theoretical constraint at the onset, they missed the opportunity to engage in theory building. The conclusion and recommendations do not go beyond the obvious and contribute little to science.

Attitudes and Perceptions of School Administrators and Agricultural Advisory Committee Chairpersons Toward Agricultural Education Programs In California

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INTRODUCTION

In California, vocational agriculture education programs in high schools are an integral part of the educational system. If vocational programs such as these are to continue to prosper and meet the needs of high school youth, they must receive the support of the public school administrators according to Brimm and Cooper (1974). The administrative support for the existence of these programs is crucial, since agriculture is California's leading industry, employing one out of four people today. California's agricultural education programs offer high school students an opportunity to explore and learn about the different aspects of the agricultural industry. Upon completion of the program, students have acquired the skills and training necessary to pursue a career in agriculture or to continue their education at one of the post secondary institutions in the state offering programs in agriculture.

For an agricultural education program to function adequately, support from the school administrators, the school district, and the community is critical. This support ensures the funding and resources necessary to meet the needs of the program and students. According to Burnett and Miller (1983), the role of local school administrators in agriculture programs may be a function of their attitudes toward these programs. Therefore, an assessment of these attitudes is important in order to maintain and to expand existing programs. These attitudes play an important role in determining not only the funding, but also the curricula choices. Brimm and Cooper found that principals are instructional leaders and that it is imperative to know and analyze their feelings. They also confirm from their study in Tennessee that programs were stronger, if the principal's attitude was positive toward that program.

Since agricultural education is a local program, school district administrators play an important role in determining what the agricultural education program will emphasize (Rush, 1984). The curriculum, although not totally dictated by local school administrators, is greatly affected by their influence. For implementation, improvement, and growth to occur in these programs, the support of the local school admininstrators becomes extremely important (Burnett and Miller, 1983). Throughout the public school system, high school principals are key decision makers in the overall curriculum and programs offered in their high schools. Their attitudes become important since they are responsible for the day to day management of high school instruction and curriculum (Rush, 1984). Their decisions can be influenced by other administrators and community members. The principal, with the aid of the district's vocational education director, usually determines any changes in the funding, curriculum, implementation, and ultimately, the continuance and growth of these vocational programs. The chairperson of the agricultural advisory committee also may give key recommendations to the principal prior to decision making. Phipps, (1980), states that advisory committees are a prerequisite for the development of sound and effective policies for a high school's agricultural education program.

PURPOSE

Given the critical role of key decision makers, this study was undertaken to determine what the attitudes and perceptions are of principals, vocational education directors, and agricultural advisory committee chairpersons toward local secondary agricultural education programs in California. The literature review revealed that limited studies had been conducted on this subject in California.

OBJECTIVES

The following objectives were designed to achieve the purpose of this study.

1. Determine the attitudes of high school principals, vocational education directors, and agricultural advisory committee chairpersons toward the effectiveness of agricultural education programs.
2. Compare attitudes of high school principals, vocational education directors, and agricultural advisory committee chairpersons toward agricultural education programs.
3. Compare the perceived attitudes of respondents that participated in agricultural education during high school to respondents that were not involved in high school agricultural education.

PROCEDURES

Population

The target population for the study was local public school principals, vocational education directors and agricultural advisory chairpersons in California that were associated with secondary agricultural education programs.

Due to California's large population and the number of schools offering agriculture, a stratified random sample of high schools was selected. The high schools were stratified by seven agricultural education regions and included only schools that offered three or more years of agriculture through a district program. Of the 297 high schools, a proportional random sample was drawn from each region for a total of 60 high schools (see Table 1). This sample size was sufficient to yield 80 percent power to detect moderate effect sizes at the .05 alpha level (Cohen, 1988).

Instrumentation

A descriptive method of research based on a 5-point Likert scale was used in this study. General attitudes were summarized into 49 brief statements regarding the importance of agricultural education programs. Respondents were asked to answer the statements by using the following descriptors and their corresponding numerical values, for which best represented their attitude regarding each specific statement: "Strongly Agree" (5), "Agree" (4), "Undecided" (3), "Disagree" (2), and "Strongly Disagree" (1). Six additional demographic and personal data questions were included in the beginning of the questionnaire.

Questionnaires were utilized from two previous attitude assessment studies in Louisiana and West Virginia, (Burnett and Miller, 1983), and (McGhee, 1975). Additional questions were developed and tested that pertained to agricultural education programs specific to California and to agricultural advisory chairpersons, since they were not included in any previous studies. Three regional supervisors and the state supervisor reviewed the questionnaire for content validity. The questionnaire was pilot tested by selected principals, vocational education directors, and agricultural advisory committee chairpersons who were not included in the sample population.

Following the pilot test, revisions were made to the original questionnaire of 50 statements. Three statements were dropped due to lack of clarity and two statements were added, that dealt specifically with agricultural education programs in California. The total number of attitude response statements on the questionnaire was 49.

Data Collection

Data was collected in March and April, 1989. Questionnaires were mailed to three groups with a cover latter explaining the purpose of the study and a self-addressed stamped envelope enclosed to encourage a response. Recipients were assured that their responses would be recorded only as group data and that anonymity would be guaranteed. Three weeks after the first mailing, a follow-up letter and another questionnaire was sent to non-respondents. Table 1 contains a summary of the response rate. The response rate of the principals was 92 percent with 55 of the 60 questionnaires returned. The response rate of the vocational education directors was 87 percent and the agricultural advisory committee chairpersons had a response rate of 81 percent. Because of the high overall response rate of 87 percent, a follow-up of non-respondents was not conducted.

Data Analysis

Data analysis included ranks, means, and frequencies to analyze the data for objective 1. A one way analysis of variance was utilized to compare mean differences among groups and a Newman-Keuls post hoc follow-up range test was conducted to determine the degree of significance for objective 2. A t-test was used to compare the mean difference for each statement between respondents that were involved in agricultural education in high school and those that were not involved. The alpha level was set a priorally at $P<.05$.

RESULTS

The mean response for each statement of each group of respondents was determined for each of the 49 items. Table 2 presents ten statements that received the highest mean ratings for each of the three groups (principals, vocational education directors, and advisory committee chairpersons) and presents the ten items that received the lowest mean ratings for each group.

The items rated highest by the principals were: FFA activities are an integral part of the agricultural education program (mean=4.78) and the state agriculture incentive grant benefits our program (mean=4.76). The items that principals least agreed with were: agricultural education programs in high school should be intended mainly for youth of limited academic talent and agriculture teachers tend to be less cooperative than other teachers in our high school.

The vocational education director group had the same highest mean rating for the first item as principals, but differed on the second item, students planning an agricultural major in college should take an agricultural course in high school (means=4.58). Vocational directors had the lowest mean rating for the same items as principals.

The items rated highest by agricultural advisory committee chairpersons were: "I am thoroughly convinced that agricultural education should be offered in high schools (mean=4.79) and agricultural education course work should be followed by teacher visits to the location of the students' project(s), (mean-4.73). Agricultural advisory chairpersons had the lowest mean ratings for the same items as principals and vocational education directors.

Table 2 also displays the mean ratings for the ten items that were rated the highest by all respondents (overall). Examination of this table revealed that the ten highest and ten lowest rated items by all groups were similar.

A one-way analysis of variance was used to compare mean differences among groups for each item. Table 3 lists the means and standard deviations of the 16 statements that were found to be significantly different among the three groups at the .05 alpha level in the one way analysis of variance before a range test was performed. The agricultural advisory committee chairpersons differed significantly from the other two groups in 12 of these 16 items. Item 24, agriculture teachers should supervise non-agriculture activities, was the only item where the means differed significantly between all three groups. The principals' mean attitude for item 34, that adequate agricultural career counseling is available from the guidance counselors, was significantly different from the two other groups.

Table 4 reveals how each group responded to the question regarding their participation in agriculture during high school. The majority of respondents that participated in agricultural education during high school was from the group of advisory chairpersons.

A t-test was performed to compare differences between the mean attitudes of all respondents based on whether or not they had enrolled in agricultural education in high school (see Table 5). The 2-tailed probability t-test resulted in 8 statements being significantly different at the .05 alpha level. Those respondents who participated in agricultural education in high school rated eight items significantly different than those respondents who had not enrolled in agriculture.

CONCLUSIONS

From this study, the following conclusions were made:

1. There were differing levels of agreement and disagreement between principals, vocational education directors, and agricultural advisory committee chairpersons regarding their attitudes and perceptions of local agricultural education programs in California.
2. Respondents who participated in agricultural education during high school tended to have a more positive attitude toward agricultural education programs in California.
3. All three groups of respondents disagreed in their opinions regarding the supervision of non-agriculture activities by agriculture teachers.

RECOMMENDATIONS

Based on the results of this study, the following recommendations were made:

1. There is a need for continued inservice education in agricultural education for high school administrators concerning the goals, objectives, and purposes of high school agricultural education programs in the public school system.
2. Agricultural advisory committee chairpersons should invite administrators to their meetings and become more actively involved as a committee to make recommendations to the administrators regarding any decision-making in the agricultural education program.
3. Agriculture teachers should work more closely with administrators to increase the understanding of agricultural education, its function, the intra-curricular activities, time commitments, and responsibilities.
4. The agriculture advisory committee members need to be inserviced on the value of implementing the California Model Agriculture Curriculum into the program and the use of the California State Incentive Grant.

Table 1 RESPONSE RATE BY GROUP

GROUP RESPONSE	SAMPLE SIZE	NUMBER OF RESPONDENTS	PERCENT
Principals	60	55	92.0
Voc. Ed. Directors	55*	48	87.0
Ad. Com. Chair.	59*	48	81.0
Total	174	151	87.0

*respondents served more than one high school

Table 2 ATTITUDES TOWARD AGRICULTURAL EDUCATION PROGRAMS

"Ten Items that Received the Highest Mean"

OVERALL		PRINCIPAL		VOC. ED. DIRECTOR		ADV. COM. CHAIR	
Item No.	Mean	Item No.	Mean	Item No.	Mean	Item No.	Mean
1*	4.68	1	4.78	1	4.58	43	4.79
33	4.57	49	4.67	27	4.58	19	4.73
49	4.54	33	4.58	49	4.54	47	4.69
27	4.51	2	4.50	33	4.48	1	4.66
19	4.49	27	4.47	19	4.46	33	4.64
43	4.48	22	4.46	43	4.44	27	4.49
2	4.43	48	4.33	2	4.40	31	4.45
47	4.38	19	4.31	48	4.35	45	4.42
22	4.29	43	4.24	47	4.31	35	4.40
40	4.28	40	4.22	40	4.27	49	4.40

"Ten Items that Received the Lowest Mean"

OVERALL		PRINCIPAL		VOC. ED. DIRECTOR		ADV. COM. CHAIR	
Item No.	Mean	Item No.	Mean	Item No.	Mean	Item No.	Mean
30	1.56	30	1.62	30	1.65	30	1.40
36	1.78	36	1.84	36	1.79	36	1.70
6	2.00	6	2.04	6	2.04	6	1.92
13	2.23	41	2.11	13	2.21	13	2.21
41	2.30	13	2.27	41	2.30	41	2.50
5	2.73	20	2.71	20	2.56	38	2.51
38	2.75	5	2.78	44	2.67	34	2.65
20	2.85	16	2.96	5	2.69	5	2.73
34	2.94	38	2.98	38	2.71	4	2.73
23	3.05	44	3.00	34	2.81	23	2.92

Table 3 MEANS AND STANDARD DEVIATIONS ON ATTITUDES FOR THE THREE GROUPS*

Item No.	Principals (1) n=55		Voc. Ed. Dir (2) n=48		Adv Com Chair (3) n=48		Newman-Keuls range test		
	mean	*(s.d.)*	mean	*(s.d.)*	mean	*(s.d.)*	Group DF=2 1 vs 2	Group DF=2 1 vs 3	Group DF=2 2 vs 3
4	3.69	*1.17*	3.48	*1.17*	2.73	*1.22*		**	**
9	3.11	*1.18*	3.31	*1.11*	4.23	*.88*		**	**
16	2.96	*1.17*	3.29	*1.24*	4.02	*.91*		**	**
17	3.42	*.88*	3.60	*.89*	4.33	*.91*		**	**
19	4.31	*.69*	4.46	*.54*	4.73	*.45*		*	*
20	2.71	*.98*	2.56	*.99*	3.29	*.92*		**	**
24	3.89	*1.13*	3.42	*1.29*	2.92	*1.18*	**	**	**
31	3.47	*1.02*	3.69	*1.10*	4.45	*.86*		**	**
34	3.29	*.94*	2.81	*1.07*	2.65	*.97*	*	*	
35	3.84	*.71*	3.90	*.81*	4.40	*.65*		**	**
37	3.91	*.78*	3.98	*.67*	3.55	*.97*		*	*
38	2.98	*.89*	2.71	*.94*	2.51	*.88*		*	
43	4.24	*.79*	4.44	*.50*	4.79	*.54*		**	**
45	3.95	*.71*	4.19	*.53*	4.42	*.74*		*	
47	4.16	*.81*	4.31	*.72*	4.69	*.69*		*	*
48	4.33	*.61*	4.35	*.70*	3.74	*.93*		**	**

* < p .05 Significance Level

** < p .001 Significance Level

Table 4 PERCENT OF RESPONDENTS ENROLLED IN HIGH SCHOOL AGRICULTURE

	Percent of Total Sample	Percent of Principals	Percent of Voc. Ed. Directors	Percent of Chairpersons
Enrolled in High School Agriculture	27	9	19	56
Not Enrolled in High School Agriculture	73	91	81	44
TOTAL	100	100	100	100

Table 5 MEAN ATTITUDES BY ENROLLMENT IN HIGH SCHOOL AGRICULTURE

No	Item	MEANS		t - test Significance
		Enrolled in Ag. Ed.	Not Enrolled in Ag. Ed.	
4	Class scheduling is usually not a problem for those students wanting to take an agriculture education course.	2.98	3.45	*
9	All students (K-12), should receive some instruction in agriculture as part of their comprehensive education.	3.98	3.36	**
16	In comparison to other teachers at our high school, the agriculture teacher's workload is greater.	3.80	3.25	*
17	I believe that the number of new occupations resulting from technological change in agriculture will increase the need for agricultural education in high schools.	4.02	3.67	*
19	Agriculture education course work should be followed-up by teacher visits to the location of the students' project(s).	4.68	4.42	**
20	Agriculture teachers have a better understanding of student needs than other teachers.	3.20	2.72	**
43	I am thoroughly convinced that agricultural education programs should be offered in high schools.	4.73	4.38	**
45	Agriculture education training of high school students, is usually beneficial regardless of the occupation entered after graduation.	4.39	4.09	*

* $p < .05$ Significance Level
** $p < .001$ Significance Level

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ATTITUDES AND PERCEPTIONS OF SCHOOL ADMINISTRATORS AND AGRICULTURAL ADVISORY COMMITTEE CHAIRPERSONS TOWARD AGRICULTURAL EDUCATION PROGRAMS IN CALIFORNIA

A Critique

Samuel M. Curtis, Penn State University--Discussant

The theory underlying this study is that the attitudes of school administrators toward agriculture education influences the content and quality of agriculture education. On the basis that advisory committee chairpersons affect the decisions made by administrators, their attitudes were also examined. I want to commend the authors for reviewing the literature and adopting the questionnaires from other studies. Even so, the reliability coefficients should have been reported. I appreciate the fact that with 87 percent return, no follow-up of non respondents was conducted.

I am concerned about the data analysis, particularly the use of the t-test. If I understand what was done, the t-test was used to compare 49 attitude statements between three pairs of groups. That means t-test was used (3x49) or 147 times. See the work of Dale Oliver to understand the high probability that at least some of the significant difference found could be due to chance.

What then is the significance of this study? When rankings were grouped all three groups agreed on the ten highest items and the ten lowest rated items. The analysis of the survey of each group on each item revealed some differences, mostly between the school administrators and the advisory committee chairpersons. Since the rankings were similar, might not the score differences simply be a difference in how the advisory committee chairpersons marked the scales. The sample was drawn as though each of the subgroups were part of that population. I suggest that the advisory persons may in fact have represented a separate and distinct population.

I have the most trouble with this study with the conclusions and recommendations. The theoretical position up front was that this attitude of the school administrators influenced the content and quality of the agricultural education program. The study did not evaluate this consturct in that the qualitative measures of programs were not obtained. The second construct was that advisory committee chairpersons influence the decision of administrators. The first part of the analysis when rankings were used tend to show similar attitudes. Where mean scores were used, the results were less clear.

Since the postulates advanced were not examined or were inconclusive, I am at a loss to know whether the recommendations make sense or not. Certainly, they cannot be derived from the findings.

ATTITUDES OF SCHOOL ADMINISTRATORS TOWARD RECOMMENDATIONS FOR VOCATIONAL AGRICULTURAL EDUCATION PROGRAM REFORM DEVELOPED BY THE NATIONAL RESEARCH COUNCIL

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INTRODUCTION

Many changes have occurred in public education since the National Commission on Excellence in Education published a report, A Nation at Risk, in 1983 and many more programs in the public schools have been reviewed and evaluated as school reform efforts have been developed (Tyler, 1987). Numerous vocational education programs have also come under close scrutiny as a result of school reform efforts and several recommendations to improve and reform the programs have been made by various groups (Walker, 1989). Cross (1987) found that the reform efforts of the 1980's looked beyond the classroom teacher action and that the advocates of reform in the secondary schools believed that the responsibility for improvement rested with those who train, select, and supervise teachers.

The National Research Council's study of vocational agriculture reported that agricultural education has lagged behind the school reform movement and that changes in vocational agriculture must occur to maintain the programs (National Research Council, 1988). Vocational agriculture education is among three vocational education programs areas whose enrollments are decreasing significantly (Frantz, 1988). In the five year period of 1983-87 vocational agriculture enrollments dropped an average of 10.88% in the United States. In the 13 states of the Southern Region of the United States vocational agriculture enrollments dropped an average of 4.65% (Frantz, 1988). These decreases in vocational agriculture enrollments have occurred despite a nationwide increase in enrollments in other vocational education programs. These statistics indicate that there may be problems with vocational agriculture education that should be addressed.

The National Research Council (1988) made twenty three recommendations for reform to serve as a guide for the profession in making changes. Those recommendations included the need for increased involvement of school administrators in vocational agriculture education at the school and school system levels. The Council also made recommendations focusing on curricula reform that will require the support and approval of school administrators at various levels. Even though some of these recommendations may require local school board policy, superintendents, vocational education directors, and principals must endorse and support such recommendations if they are to be implemented successfully. In order for administrators to support and endorse such proposals, they should be knowledgeable and understand the need for implementation of such proposals. To this end, an implication of the National Research Council's study is that secondary level school administrators need to assume a greater leadership role in agricultural education in the public schools.

The Council of Chief State School Officers also made numerous recommendations for changes in the Carl Perkins Vocational Education Act when Congress began debate on the reauthorization of the Act in March, 1989. The recommendations the Chief State School Officers included the development of more intensive efforts to hold secondary level school administrators "accountable" for the success of their vocational education students (Walker, 1989).

If school administrators are to assume a greater leadership role in their local vocational agriculture programs as recommended by the National Research Council, and are to be held more accountable for the success of their vocational students, and consequently of the secondary vocational programs as the Council of Chief State School Officers recommended, it is important to know and understand how school administrators perceive vocational education in general, and the various vocational education programs in general. Local autonomy is a concept that is currently receiving a lot of attention across the nation. In North Carolina, The School Improvement and Accountability Act of

1989 is allowing local school systems and individual schools to develop plans for school improvement which allows decisions, once made by the state and/or local boards of education, to be made at the school building level. Decisions affecting funding, teacher certification, and school organizational structure are among many that school administrators are now in a position to make.

With increased autonomy at the local level, a need exists to determine how school administrators view the vocational agriculture programs in their schools or school systems. Knowledge of the attitudes of various educational administrators toward vocational agriculture in general, and toward the recommendations for reform of vocational agriculture education programs developed by the National Research Council would be of value to local agriculture teachers and the agricultural education profession. Although the recommendations of the National Research Council are national in scope and intended for the Agricultural Education profession in general, the implementation of the recommendations will occur on the local level.

PURPOSE AND RESEARCH QUESTIONS

The purpose of this study was to determine the attitudes of school administrators in the Southern Region of the United States toward the recommendations for vocational agriculture reform which were developed by the National Research Council and published in the report titled, Understanding Agriculture. New Directions for Education. More specifically, this study was designed to answer the following research questions:

1. What are the attitudes of school administrators in the Southern Region of the United States toward recommendations for program reform developed by the National Research Council for vocational agriculture education and published in the report titled, Understanding Agriculture: New Directions for Education?

2. Are the attitudes of school administrators in the Southern Region of the United States toward the recommendations for program reform developed by the National Research Council different among principals, vocational education directors, and superintendents?

PROCEDURES

The population for this study included the 3948 principals, 1307 vocational education directors, and 1422 superintendents from the 13 states that constitute the Southern Region of the United States, as defined by the American Association of Teacher Educators in Agriculture, who had vocational agriculture education in their schools or school systems during the 1988-89 academic year. The population was identified from 1988-89 state education directories and state vocational agriculture directories obtained from the department of education in each state and these directories served as the frame for the study. Independent samples were drawn from each of the three groups of administrators by a computer generated random selection process resulting in total combined research sample of 950 administrators. The research sample actually consisted of 350 principals, 297 vocational education directors, and 303 superintendents. The samples were proportionally stratified by administrator type and by state. The sample sizes were determined by using Cochran's Formula for Sampling for Proportions with a confidence level of .95 and an accuracy level of .50 (Cochran, 1977).

The data collection instrument for this study was researcher developed and was sent to 45 randomly selected school administrators in North Carolina as a field test. Principals, superintendents, and vocational education directors were equally represented in the field test. The persons selected to participate in the field test were asked to review and complete the instrument and to make any comments or suggestions they thought could be used to improve its clarity. Only minor editorial changes were made in the instrument based on the recommendations of the field test respondents. Since no major content or editorial changes were may as a result of the field test, the same population of school administrators selected for the field test were used to determine the reliability of the research instrument utilizing a test-retest procedure. A six-week time interval was used between the deadline date established for the field test and the second administration of the instrument for the purpose of collecting data for calculating instrument reliability. A comparison of the test-retest data determined the reliability of the instrument to be .95. Content validity was assessed by a committee of experts in the agricultural education profession including vocational agriculture teachers, agricultural education teacher educators, and State Department of Public Instruction agricultural education consultants.

Each member of the research sample was sent a printed survey instrument along with an addressed, return envelope with instructions to return the completed survey within two weeks. A post card was sent to those who had not responded by the end of the two week period. A follow-up mailing, consisting of a cover letter, printed survey instrument, and addressed return envelope was sent to those members of the sample who failed to respond to the first mailing or to the post card approximately a week after the post card reminder was mailed. Those persons receiving a second survey instrument package were asked to return the completed survey within two weeks. A total of 664 responses were received as a result of the mailings of which 654 were usable. Approximately, a10% (n= 30) of the nonrespondents who had not responded within two weeks of the second mailing of the survey instrument were selected at random and an instrument was completed for them by a telephone interview. The information obtained by telephone interviews was statistically compared using Multivariate Analysis of Variance (MANOVA) to the responses received by mail and no significant differences (F = 1.49, p = 0.0944) were found between the two groups. The mail respondents and phone respondents were then combined for purposes of statistical analyses, resulting in a total usable response of 684 or 72% of the research sample. Sixty-one percent of the superintendents, 66% of the principals, and 90.23% of the vocational education directors responded to the survey.

ANALYSIS OF DATA

Descriptive statistics were utilized for the study and frequencies, means, standard deviations, and percentages were calculated to describe the research sample and their attitudes toward the recommendations for vocational agriculture education program reform. Multivariate Analysis of Variance (MANOVA) was used to determine whether the three groups of administrators differed significantly in their attitudes toward the recommendations made by the National Research Council (1988) for vocational agriculture education program reform. If the MANOVA was found to be significant using the Wilks Lambda, which is appropriate for three or more independent samples, analysis of variance (ANOVA) was used to determine which recommendations were significantly different among the administrators. Those recommendations found to be significant by the ANOVA were tested using the Fisher Least Significant Difference test to determine the significant relationships between administrators. The data were analyzed using the Box M test and were found to be homogeneous. An alpha level of .05 was selected a priori for the study.

RESULTS

The population for this study included the school administrators, principals, vocational education directors, and superintendents from the 13 states that constitute the Southern Region of the United States, as defined by the American Association of Teacher Educators in Agriculture, who had vocational agriculture education in their schools or school systems during the 1988-89 academic year. The administrators ranged between 30 and 67 years of age and averaged 48.17 years. The average age of superintendents was 49.37 years, principals 46.01 years, and vocational education directors 49.03 years. The administrators' tenure in their present position ranged from one to thirty-six years with a mean of 9.106 years. The mean tenure for superintendents was 7.90 years, principals 10.41 years, and vocational education directors 9.40 years. Fifty percent of the administrators had been in their present position for seven or less years. Forty-seven percent of the administrators took at least one vocational agriculture course in high school and 20% of those taking agriculture courses received four or more agricultural education credits. Superintendents, principals, and vocational education directors took an average of 1.603, 1.286, and 1.637 vocational agriculture courses in high school respectively. Administrators who had been vocational education teachers in areas other than agriculture accounted for 24.5% of the sample while 15.5% of the sample had taught vocational agriculture at the high school level.

The data collection instrument for this study was researcher developed and was administered through a mail survey. In addition to requesting demographic data, the data collection instrument included a listing of each of the 23 recommendations developed by the National Research Council (1988). The administrators were asked to express their attitudes toward each the recommendations listed on on the instrument according to the following scale: 1 = Strongly Disagree (Respondent disagreed with the statement without exception), 2 = Disagree (Respondent disagreed with the statement, but was not 100% opposed to the the statement), 3 = Slightly Disagree (Respondent disagreed with some elements of the statement, but not the whole statement), 4 = Slightly Agree (Respondent agreed with some element of the statement, but not the whole statement), 5 = Agree (Respondent agreed with the statement, but not 100% supportive of the statement), or 6 = Strongly Agree (Respondent agreed with the statement without exception). Group means scores were calculated for each of the items on the instrument using this six-point scale. The group means were interpreted as follows: Strongly Disagree = 1.00 to 1.50; Disagree = 1.51 to 2.50; Slightly Disagree = 2.51 to 3.50; Slightly Agree = 3.51 to 4.50; Agree = 4.51 = 5.50; and Strongly Agree = 5.51 to 6.00.

As indicated in Table 1, administrators agreed with eight, slightly agreed with fourteen, and slightly disagreed with one of the 23 program reform recommendations made by the National Research

Table 1

Attitudes of school administrators from the Southern Region of the United States toward the reform recommendations developed by the National Research Council in 1988

Attitudes/reform recommendations	M	SD
Agreed		
1. Teacher education programs in agriculture should continue to stress applied learning, but should strengthen instruction in science, agribusiness marketing and management, and international agriculture.	5.0101	0.958
2. Each school with a program in agriculture education should have an active advisory council.	4.992	1.113
3. All schools with vocational agriculture programs should have FFA chapters.	4.991	1.180
4. In setting the future course for vocational agriculture education, education leaders should consider student employment opportunities in the service or business sectors related to agriculture.	4.935	0.916
5. Ongoing efforts should be expanded and accelerated to upgrade the scientific content of agriculture courses.	4.887	0.949
6. A substantial amount of applied science principles and concepts should be infused into the high school vocational agriculture curricula.	4.795	0.932
7. The FFA should encourage membership by students unable or unwilling to participate in a 4-year program of vocational agriculture.	4.637	1.181
8. A substantial amount of agricultural marketing and distribution techniques, (such as economics, pricing, packaging, futures trading, value added processes, and advertising,) should be infused into the high school vocational agricultural curricula.	4.555	1.067

(table continues)

Attitudes/reform recommendations	M	SD
Slightly agreed		
9. A substantial amount of international agriculture, (such as cultures, production practices, economies, and technologies,) should be infused into the high school vocational agriculture curricula.	4.412	1.025
10. The FFA should revise the nature, focus, and awards structure of its contests and activities to open new categories of competition in areas other than production agriculture and leadership.	4.381	1.199
11. Instructional materials in elementary and secondary science courses should be designed to provide students opportunities for increased understanding of the agricultural food and fiber system.	4.362	0.975
12. All students should participate in worthwhile Supervised Agriculture Experiences (SAE) while enrolled in vocational agriculture programs.	4.324	1.256
13. Science teachers and specialists with a knowledge of agriculture should examine existing curricula and instructional materials to identify opportunities to incorporate subject matter from the agricultural sciences into science instruction.	4.295	1.070
14. Beginning in kindergarten and continuing through the twelfth grade, all students should receive some systematic instruction about agriculture to increase agricultural literacy of US citizens.	4.169	1.312
15. State education leaders, school administrators, and school boards should develop and implement a plan to foster instruction about the food and fiber system.	4.100	1.156
16. The primary focus of secondary agriculture education should be occupational training.	3.821	1.231
17. Agricultural courses should be credited toward satisfying high school graduation requirements for science courses.	3.741	1.590
18. Agricultural educators should serve on selection committees for mathematics and science instructional materials such as textbooks and likewise, mathematics and science educators should serve on selection committees for instructional materials for agriculture.	3.716	1.392

(table continues)

Attitudes/reform recommendations	M	SD
19. School administrators, teachers, state departments of education, and teacher education personnel should participate in professional development activities focused on the integration of agriculture into the curriculum in kindergarten through twelfth grade.	3.692	1.328
20. Teachers in all grade levels and subject areas should be encouraged to modify lesson plans to incorporate materials about the economic aspects of agriculture.	3.684	1.372
21. The word "vocational" in "vocational agriculture" should be deleted so students who are academically inclined will enroll in agricultural education programs.	3.656	1.439
22. Representatives of agribusiness, particularly at the local and state levels, and community leaders should meet with school officials to implement cooperative efforts to bring more agriculture into all courses in the high school curricula.	3.603	1.171
Slightly disagreed		
23. The name of the student organization for students in agriculture should be changed from the Future Farmers of America to simply the FFA to broaden the public perception of the organization to indicate it has a contemporary, forward-looking image of agriculture.	3.301	1.455

Council (1988). Of particular interest was that the recommendation with which the administrators had the strongest level of agreement was "teacher education programs in agriculture should continue to stress applied learning, but should strengthen instruction in science, agribusiness marketing and management, and international agriculture." This finding supported the research findings of Cross (1987,) which found that the reform efforts of the 1980's looked beyond the classroom teacher action and that the advocates of reform in the secondary schools believed that the responsibility for improvement rested with those who train, select, and supervise teachers. It was also of interest that the only recommendation the administrators slightly disagreed with was the recommendation that "the name of the student organization for students in agriculture should be changed from the Future Farmers of America to simply the FFA to broaden the public perception of the organization to indicate it has a contemporary, forward-looking image of agriculture." This finding would indicate that the administrators feel it will take more then a name change of the vocational student organization to develop a public perception that the organization is a contemporary and forward looking one.

Multivariate Analysis of Variance (MANOVA) was used to determine differences in opinions related to the recommendations developed by the National Research Council (1988). Using the Wilks' Criterion, the differences in levels of agreement among the administrators were found to be significant ($\underline{F} = 4.93$, $\underline{p} = 0.0001$). Analyses of Variance as a follow-up procedure to the MANOVA were used to analyze the data for the individual recommendations for vocational agriculture program reform, and of the 23 recommendations, 20 were rated significantly different by the administrators. A significant difference was found in all the recommendations except number 12, "all students should participate in worthwhile Supervised Agriculture Experiences (SAE) while enrolled in vocational agriculture programs," number 21, "the word 'vocational' in 'vocational agriculture' should be deleted so students who are academically inclined will enroll in agricultural education programs," and number 23, "the name of the student organization for students in agriculture should be changed from the Future Farmers of America to simply the FFA to broaden the public perception of the organization to indicate it has a contemporary, forward-looking image of agriculture." Fisher's Least Significant Difference (LSD) Tests were conducted to determine where the differences among the groups of administrators were located. In general, as reported in Table 1, the principals, vocational education directors and superintendents were all found to be supportive of the reform recommendations developed by the National Research Council. However, in 60% of the recommendations where significant differences occurred, vocational education directors were found to be significantly different from superintendents and principals and were more supportive of all the recommendations for program reform except for one. That recommendation, "a substantial amount of international agriculture, (such as cultures, production practices, economies, and technologies,) should be infused into the high school vocational agriculture curricula" was rated significantly higher by the superintendents.

In all but two cases where a significant difference was found in the level of agreement for the reform recommendations, principals were found to express a lower level of agreement then did either the vocational education directors or superintendents. The principals' level of agreement was found to be significantly lower then the vocational education directors and superintendents for six of the recommendations. Those recommendations were: 1. "ongoing efforts should be expanded and accelerated to upgrade the scientific content of agriculture courses," 2. "a substantial amount of applied science principles and concepts should be infused into the high school vocational agriculture curricula," 2. "a substantial amount of international agriculture, (such as cultures, production practices, economies, and technologies,) should be infused into the high school vocational agriculture curricula," 4. "state education leaders, school administrators, and school boards should develop and implement a plan to foster instruction about the food and fiber system," 5. "agricultural educators should serve on selection committees for mathematics and science instructional materials such as textbooks and likewise, mathematics and science educators should serve on selection committees for instructional materials for agriculture," and 6. "the primary focus of secondary agriculture education should be occupational training.

CONCLUSIONS

The following conclusions were drawn from the data presented:

1. Administrators support the recommendations developed by the National Research Council for reforming vocational agriculture programs. However, administrators were not fully supportive of the recommendations as evidence by the group mean ratings of slightly agree or slightly disagree with approximately two-thirds of the recommendations.

2. While administrators tended to agree with the majority of the recommendations for vocational agriculture education from the report of the National Research Council for reforming vocational agriculture programs, significant differences were found among the administrators' levels of agreement on 20 of the 23 recommendations. Vocational directors were more supportive of the recommendations than principals and superintendents. In thirteen of the twenty post hoc analyses of the significant differences among administrators' levels of agreement for the recommendations, vocational education directors were significantly more supportive than principals and superintendents. While all three groups of administrators tended to be somewhat supportive, principals were the least supportive of the recommendations for vocational agriculture program reform. For seventeen of the recommendations, principals levels of agreement were lower than either the superintendents or vocational education directors.

RECOMMENDATIONS

1. The highest mean rating among the recommendations for vocational agriculture program reform developed by the National Research Council was that "teacher education programs should strength instruction in science, agriculture marketing and management, and international agriculture," which implies that teacher education programs in agricultural education are the keys

to change in vocational agricultural education. It is, therefore, recommended that teacher education programs review current curricula and make necessary changes in order to produce agricultural teachers who can incorporate science, agribusiness marketing and management, and international agriculture into current and future vocational agriculture education curricula at the secondary level.

2. Administrators slightly agreed with 14 of the recommendations developed by the National Research Council for reforming vocational agricultural education programs which, by some people, could be interpreted to say that administrators are indifferent toward these recommendations. Therefore, it is recommended that additional research be conducted to determine why administrators do not have stronger feelings toward these recommendations. Also, vocational agriculture teachers should work with their administrators and attempt to implement all of the recommendations that can be agreed upon by local school administrators.

3. Significant differences existed among administrators attitudes toward 20 of the 23 recommendations developed by the National Research Council for reforming vocational agriculture education programs. It is unlikely that implementation of these recommendations will occur at the local level without consensus of the principals, superintendents, and vocational education directors. Therefore, additional research should be conducted to determine why these differences exist in the attitudes of the different types of administrators.

4. Principals had a lower level of agreement then either the vocational education directors or the superintendents on all but two of the recommendations. Therefore, it is recommended tat additional research be conducted to determine why the level of support for the reform recommendations were lower for the principals then for the vocational education directors or superintendents, especially since the principals work more closely with vocational agriculture teachers and programs on a daily bases.

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ATTITUDES OF SCHOOL ADMINISTRATORS TOWARD RECOMMENDATIONS FOR VOCATIONAL AGRICULTURAL EDUCATION REFORM DEVELOPED BY THE NATIONAL RESEARCH COUNCIL

A Critique

Samuel M. Curtis, Penn State University--Discussant

The authors of this paper are to be commended on the comprehensiveness and thoroughness of this project. The project is based on the assumption that school administrators are the change agents in schools; and, therefore, their attitudes toward the National Research Council's report advocating change in agricultural education curriculum matters. Alternative hypotheses that teachers are the change agents or that public opinion causes change are not discussed. It would have been helpful to have set the theoretical framework around change agents in schools and the role of school administrators in that process. Nevertheless, it is important to know that school administrators do in fact generally support the recommendations of the report Understanding Agriculture. Perhaps the general agreement among administrators is the most important finding of this study. That principals were the least supportive is instructive. The effective school's research suggest that it is the principal who is the educational leader in the school. If then, the principal's support for change is not fully committed, the change process is complicated by that reality.

No attempt was made in this study to ascertain whether some of the recommendations were more important than others. If teacher education should strengthen instruction in science, agribusiness, marketing and management and international agriculture is the most critical recommendation, it suggests that the profession and the school's administration agree. If our priorities are in the same rank order as those of administrator, then we can proceed with confidence that we are all on the same track.

This study yields important information, but it is incomplete. The profession needs to prioritize the criticality of each of the recommendations. Only then can the results of this study be useful.

TEACHER ATTRIBUTES IN EXEMPLARY VOCATIONAL EDUCATION

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> *"I used to be smart, but now I'm not...."*
> (High school student, 1989)

The quotation above was offered by a high school student who previously had been an academic achiever and, because she had experienced some of the problems of youth, was now struggling to stay in school and in society. While her family had given up on her, her high school vocational teacher was one of the reasons she had yet to give up entirely on herself. He cared.

INTRODUCTION

The study of excellence in education is most frequently focused toward programs, classrooms, or individual student performances. Research questions are usually framed to study the course content, methods of instruction or specific elements of delivery. The broader institutional context in which learning is nested seldom has been researched. What and how the institution contributes to the specific elements commonly associated with educational excellence is seldom addressed in the literature. Although the institutional contributions to excellence are not often addressed, the effective schools literature consistently advocates that the school site should serve as the base for educational improvement efforts (Finn, 1984; Goodlad, 1984; McNett, 1984; Minnesota Department of Education, 1989). It must also be noted that the effective schools and excellence literatures have primarily been directed at elementary schools and comprehensive high schools. Studies focusing on the role of vocational education institutions and their link to educational excellence are practically nonexistent.

This study was part of a larger project which was based on the premise that the study of institutions in which exemplary vocational education programs are found might provide insights into the role that the institutional environment plays in fostering education excellence. One of the major themes which began to emerge from that project concerned the attributes of the instructors in the vocational programs and the particular institutional characteristics which support instructors in exhibiting behaviors which contribute to program excellence.

Prior to proceeding with this study, a comprehensive literature review was conducted regarding effective schools and educational excellence. Many themes surfaced in this review. Selected themes related to the role of the teacher were: a) high standards and expectations for students (Mackenzie, 1983), b) collaborative and cohesive teaching staffs (Minnesota Department of Education, 1989), and c) teachers as primary actors in achieving educational excellence (Raiche, 1983).

PURPOSE AND OBJECTIVES

This study sought to identify the attributes and behaviors of vocational teachers in a set of nationally selected exemplary schools. Further, it sought to begin the process of describing the relationships between teacher attributes and the characteristics of exemplary institutions. Specifically, the study addresses the following objectives:

1. To describe the relevant attributes and behaviors of vocational teachers in exemplary vocational education institutions.

2. To describe the apparent institutional characteristics which support teachers in exemplary vocational institutions.

RESEARCH METHODS AND PROCEDURES

Naturalistic procedures were used for this study. The study employed an interpretive ethnographic design that sought meaning and understanding, through a search for patterns (Dobbert, 1982; Fetterman, 1989), from within the context of the setting. The study was empirical because it assumed that there were neutral grounds for showing which of several explanations was closest to reality. It was, however, not positivistic because it did not bestow epistemic privilege on any prejudged set of criteria.

The first procedural step was the formation of a carefully selected national resource group. Membership included individuals knowledgeable about vocational education institutional settings and the study of institutions using naturalistic approaches. The primary functions of this group were to provide general consultation about the project and to assist with the identification and selection of study sites.

Institutions offering exemplary vocational education programs were identified through the use of the resource panel. Panel members identified other knowledgeable individuals in the field who, with the panel, assisted in the selection of sites. Based on the input from the panel and the other knowledgeable individuals, a listing of approximately 25 institutions was identified. Comprehensive high schools, secondary vocational centers, postsecondary technical institutes/colleges, and community colleges were all in this listing. These institutions provided the pool from which sites were chosen for inclusion in the pilot and field studies.

A pilot study was conducted in four comprehensive high schools to develop specific procedures for the research. In this approach, the same team of two to three knowledgeable researchers visited each institutional site to observe activities and to interview staff members and students. In consideration of the ethnographic research design utilized for this study, the researchers served as the instruments for collecting data. No predetermined criteria were used to guide the observations and interviews.

Field studies were conducted in 12 states at two comprehensive high schools, five secondary vocational centers, four postsecondary technical colleges, three community colleges, and one proprietary postsecondary technical institute. During field site visits, systematic observations and interviews were conducted with representative institution staff members and students. Copious field notes were made of the observations and interviews. Audio tape recordings were also made of selected individual and group interviews. These were later transcribed and indexed with the field notes. Joint interpretation and triangulation procedures were used to validate the data collected.

RESULTS

An analysis of the data collected from all institutions visited by the research team yielded several themes which were consistent across all of the institutions studied, regardless of their clientele or mission. Several of the most notable teacher characteristics are presented in this section. Thematic areas related to institutional characteristics that are associated with teacher attributes are also discussed.

Among the most apparent attributes of vocational teachers in exemplary programs was an attitude of caring. Teachers exhibited genuine concern for their students as individuals and students detected this concern. Example student comments regarding their teachers which reflected this teacher attribute were:

> They care here.... You can tell by their actions...if you've got a problem, they'll pull you out of class and talk to you and they'll do everything they can to help you.
>
> The teachers seem like they're here for the kids, not as a job, but that they want to be involved with like your personal (life).... If there's something wrong, not in school, it's like they care, and they want to help you get back into it....
>
> That's what makes me want to come here. If we say like, "Oh gosh, we're just dumb" or something like that, the teachers say "No, you're not".
>
> I got a thank you note (from my instructor) in the school mail today telling me thank you. That's something I've never had before from any teacher. That helps a lot. Just a pat on the back. Acknowledging what you do.

Teachers in exemplary programs accepted student diversity. They recognized that each student has different abilities, wants and needs. These teachers allowed students to be unique. They used these differences to create learning environments suitable to the individual student and to the collective class. Some typical student comments illustrating this teacher characteristic were:

> I learned a lot in her class. She makes literature fun. I'm serious. She really made it fun.... We related the plot of the story into our own life. Even though it may have been written two hundred years ago, there's something in there that affected the writer that can also affect

> our lives.
>
> We set up reading groups and math groups that we help with. We set up groups that might be embarrassed to go to learning lab and we do that right in class.
>
> He (the instructor) knows where we're coming from. He doesn't do it from his standpoint. (Instead, he understands) everybody else's standpoint, where everybody is. He makes it where we are and how we're going to move into their positions...
>
> (The instructor) will keep explaining it to you until you understand how to do it. Some other teachers will just assign the work and nobody will talk to you (about what you did wrong).... But he'll hold the whole class up to teach that one person (who doesn't understand something). He'll go over it again and again until they know what he's doing. Either that or he'll just decide to let the others go ahead and he'll work with the one person.

Teachers created a positive climate in their classes. They were demanding, having high expectations of students, yet they were friendly and encouraging. The environment created by these teachers was one of challenge for students to better themselves. Students were accepting of this and felt comfortable in their classes. Several student responses related to climate and high expectations were:

> (The instructors) want you to work to your potential. But if you're having trouble with something, they don't say "You've got to know this by tomorrow." Instead, they'll help you with it. If they see that you're trying to work up to your potential, that's fine. But if you're just sitting there in class not doing anything, just barely doing anything, just to pass, that's not what they want. They want you to work to your potential.
>
> Everybody gets along in our class. ...we never laugh at anyone, we laugh with them. When you can take someone laughing at something you did and laugh with them back again, you know you're getting along real well. The atmosphere in the classroom is created by the instructor....

The teachers offered support beyond the normal expectations of a normal teacher-student relationship. They were willing to spend time with students or spend time performing duties not usually considered to be part of a teacher's responsibilities. The student cited in the preface of this paper noted that "Mr. XXXX calls me some mornings to make sure I come to school. He does that for several students". Other student responses reflecting this teacher characteristic were:

> (The instructor) is setting me up with displaced homemakers, so that I can have some kind of outlet there for my children and just (reduce) the stress level for me. She calls me two times a week at home to see--"Can you make it to class? Is there a problem? Do you need a ride?" She's there. And a lot of times she's there when I don't even acknowledge the fact that she's there. She'll walk up and say "Did you forget so and so meeting or do you know you have to do this today?" And she'll say

> "...are you O.K.?" And if I'm not she'll pull me in the office and we'll have a good cry and then she sends me back on my routines. She's been a lot of support for me, because she has two children and she's single also. And she's pulling me through it, she really is, because without her I would have already dropped out. I would have had to, I wouldn't have had a choice, but she's given me all these options that I can do. And when I can't do (things), she's given me make up times...and she's not that way with just me--she's that way with all of her students.
>
> I found that in my class, the teacher works with the students if they have problems with things or they're having problems at home or something, he'll take them in his office and talk to them, try to help them work things out.... He'll even give them his home phone number if they ever need help or somebody to talk to.... And in a sense, my teacher has become a friend for me because we've done some things together and we can talk and it's worked out great....

Many teacher attributes were observed by the researchers or summarized from the discussions with many individual students. Space limitations preclude presentation herein of the rich ethnographic data to support these observations in detail. Therefore, the remainder of the findings presented in this paper will not include specific quotations from students and teachers.

The teachers in the study were patient and willing to create opportunities for students to discuss their needs. They practiced esteem building and student participation in their educational processes. They were good communicators. Research observations concluded that these teachers maintained a professional appearance and expected the same of their students.

Many other attributes of effective teachers were noted and are validated in the education literature, such as those related to teaching methods and knowledge of subject matter. The second objective of the study looked at institutional characteristics which create the opportunities for teachers to "be exemplary."

School climate factors were identified as both a major theme and as a subtheme related to teacher attributes. School climate factors observed included a conspicuous focus on quality, an orderly and clean physical environment, and an attitude of pride on the part of staff and students.

With regard to institutional and program funding, a critical thresh-hold level above which teachers are free from concern about resources was observed. Ostensibly, when funding falls below that level, teachers attentions are diverted from critical positive educational concerns. As an example, equipment in exemplary programs was reasonably up-to-date for the purposes intended.

Administrative styles tended to be participatory rather than authoritarian. These administrators also appeared to lead rather than manage people and were generally proactive rather than reactive. They modeled a sense of caring which was manifested as a sense of community within the school. Teachers exhibited a sense of being able to determine their own destinies as professionals as well as the destinies of their programs.

Administrators had high expectations of themselves and of their staff members. Administrators were supportive of new ideas presented by their staffs.

Teachers noted a sense of autonomy in their instructional activities. They felt that the institution allowed them the opportunities to develop their own programs. Teachers were actively involved in curriculum development and in initiatives for curriculum change. They tended to be satisfied with their jobs, were competent and knowledgeable, and had positive expectations of professional behavior. They genuinely cared about the institution and had high expectations of themselves. They cooperated with other staff members and sometimes engaged in friendly competition with each other. "Flexible" was a term that characterized how the institution dealt with teacher and program diversity.

Students expressed a sense of self-pride, of pride in their programs and in their institutions. They also had high expectations of themselves and of their programs. Professional behavior and dress standards were characteristics exhibited by many students. Students generally had productive and effective relationships with their instructors.

CONCLUSIONS

The findings noted above illustrate selected behaviors or characteristics that were exhibited by exemplary vocational teachers and institutions. An awareness of these characteristics and behaviors can be of great value for all vocational education institutions. The findings could be especially valuable in stimulating discussions at the institutional level and also between institutions which focus on the achievement of quality and excellence.

Teachers of vocational programs in exemplary vocational institutions exhibited several common attributes. Students perceived these teachers to be genuinely caring about their personal and professional lives. It may be of some importance that this attribute was both noted by the researchers and by the students; it seemed to permeate the student - teacher relationship. Other attributes included: a) a sincere concern for student diversity, b) high expectations of students, c) an ability to create a positive classroom climate, d) a willingness to support students beyond the expectations of a normal student-teacher relationship, e) exhibition of a professional appearance, f) knowledge of subject matter, and e) effective selection and use of teaching methodologies.

If these attributes are learnable by teachers, then teacher training should begin to prepare teachers with these skills. In addition, local educational institutions should begin to create in-service systems to prepare teachers with these skills.

However, if these attributes are not learnable by teachers, but are innate abilities, then teacher education programs should select candidates possessing these skills. Likewise, local educational institutions should select teachers with these attributes from among candidates being considered for instructor positions.

One question asked of many of the chief administrative officers in the study dealt with selection and training of their teachers. Nearly all administrators indicated that knowledge of the technical subject matter was insufficient in making hiring decisions. Many administrators allowed the search committees to determine if applicants possessed adequate technical knowledge, while they were most concerned with the degree to which the applicants could "relate to people."

Institutions offering exemplary programs of vocational education attempt to create an environment in which instructors are given a feeling of self-efficacy and are held accountable for their programs. One administrator summarized, "We hire good people and then let them do their thing."

It was apparent to the researchers that many vocational programs and institutions express pride in their having adopted a technology-based philosophy of education, in the vein of Snedden and Prosser's "Social Efficiency Model" (Luetkemeyer, 1987). While few teachers could articulate this philosophy, it was apparent by the wide-scale use of competency-based education materials which were founded on task analysis procedures. However, teachers in truly exemplary institutions also seem to have adopted a competing philosophy (which they were no more able to articulate). This philosophy, which tends to be humanistic/progressive, is more in line with Dewey (Hook, 1950) and places great importance on the holistic development of the individual.

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TEACHER ATTRIBUTES IN EXEMPLARY VOCATIONAL EDUCATION

A Critique

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This is a refreshing study, even though the title only describes half of the content. I am particularly pleased to see a genuine attempt to build theory. Using the effective schools as background, the researcher, through ethnographic means, sought to identify important teacher research attributes and the supporting institutional attributes. Although it is obvious that much literature review occurred; and more importantly, much thought went into its interpretation, I would prefer that we go even further. For example, does Bronfenbrenner's social embeddedness theory relating to children and families cross over with implications for teachers and schools and youth? I applaud the authors for what they have done--might you not have gone even further?

In the study itself, it would have been helpful to have better described the manner in which and the criteria for selection of the exemplary schools. An explanation of the reasons for the variety of schools examined would have been helpful. Also, I'm not sure from the manuscript whether the same two to three researchers visited each school or whether different researchers were involved?

Again, in the conclusion section, this narrative reflects the findings of this study. I am somewhat perplexed with the final paragraph. The attempt to reconcile Snedden's and Prosser's social efficiency theory with Dewey's human resource development theory is a bit tenuous in light of the fact that very little was reported in the paper that showed the applications of the social efficiency theory. Even so, this was the best paper I've read in a long time.

TRANSACTIONAL PREFERENCES OF STUDENTS AND TEACHERS DURING GROUP PROBLEM SOLVING

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INTRODUCTION

A need for research in problem solving teaching has been substantiated (Moore & Moore, 1984; Flowers, 1988). Many of the problems facing agriculture are more appropriately solved by groups than individuals. Research in group problem solving teaching is needed to better understand and improve this strategy in the agricultural education classroom. With little empirical support, positive outcomes relating to equal or transactional participatory interaction have been substantiated for problem solving in educational (Cohen, 1986; Dewey, 1916; Friere, 1970; Krebs, 1982; Warmbrod, 1969), development communication (Cohen & Uphoff, 1980; Nair & White, 1987), and work (Herzberg, 1959) settings. Results from a study by Dormody and Sutphin (1990) of secondary school agricultural education students and teachers, suggested relationships between student/teacher participatory interaction and both student motivation to participate and student satisfaction during group problem solving. They recommended establishing a transactional to slightly student-dominated student/teacher participatory interaction during group problem solving.

In development communication, the relationship between rural target group members and development communicator(s) is intuitively similar to a student/teacher relationship in terms of information and technology transfer. Ideally, participatory interaction between group members and development communicator(s) will most frequently fall close to the transactional midpoint on a participatory interaction continuum during group problem solving relating to acceptance of new ideology and/or technology (Cohen & Uphoff, 1980; Nair & White, 1987). Nair and White depicted transactional participatory interaction as a constant give and take between group members and development communicator(s), and identified five important areas of transactional participatory interaction: shared decision making, shared discussion, shared leadership, agreements reached by consensus, and mutual respect.

This study explored student and teacher preferences toward these five areas of participatory interaction during group problem solving in secondary school agricultural education.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine preferences of New York secondary school students and teachers of agricultural education for five areas of participatory interaction during group problem solving. Specific objectives were to determine student and teacher preferences for:

1. Overall student/teacher participatory interaction.
2. Student/teacher participation in decision making.
3. Student/teacher participation in discussion.
4. Student/teacher participation in leadership.
5. How agreements are reached
6. Mutual student/teacher respect

PROCEDURES

A replicated case study design was employed in naturalistic classroom settings. Multiple methods of data collection and quantitative and qualitative data analysis techniques were employed. Variables reported descriptively were: preference for overall student/teacher participatory interaction, preference for student/teacher participation in decision making, preference for student/teacher participation in discussion, preference for student/teacher participation in leadership, preference for how agreements are reached, and opinion of mutual student/teacher respect.

Twenty seven secondary school agricultural education programs in New York State approved as student teacher placement centers by the State Department of Education and the Program Area of Agricultural and Occupational Education at Cornell University provided the basis for sample selection. Four agricultural education programs, representative of the 27 programs with respect to placement center selection criteria, were chosen because of:

1. Driving distance for the researchers
2. Sufficient teacher experience in problem solving teaching
3. Teacher agreement to participate
4. The availability of a Basic Agricultural Skills (BAS) class which had not yet undertaken a problem solving instructional unit that is part of the state curriculum.

A total of 58 of the 61 students enrolled in the four classes participated in at least three stages of a treatment group problem solving activity. Five students were selected randomly from each class, providing a sample of 20 students for clinical interviews. The four teachers were also interviewed.

A six-stage problem solving model, adapted from the state curriculum, guided group problem solving activities during the research: Stage 1 - Define the problem; Stage 2 - Identify possible solutions; Stage 3 - Gather information; Stage 4 - Analyze information and choose an alternative; Stage 5 - Implement an alternative; Stage 6 - Evaluate the outcome and modify the alternative.

The four teachers were contacted by mail and phone. A researcher visited each school to prepare teachers, students, and administrators for the study. As a pretreatment procedure, each class participated in the problem solving instructional unit from the state curriculum. They then participated in a group problem solving lesson on land resource stewardship. The purpose of the pretreatment was to develop group problem solving understanding, skills, and social dynamics prior to solving a group problem during the treatment. Five 40 minute class periods were allotted to solving the pretreatment group problem. For a treatment procedure, each class solved another group problem on land resource stewardship. Classes were allotted seven periods to solve the treatment problem.

Instruments were developed by the researcher based on a review of related literature. Likert-type scales were developed to measure preference for overall student/teacher participatory interaction, preference for student/teacher participation in decision making, preference for student/teacher participation in discussion, preference for student/teacher participation in leadership, and opinion of mutual student/teacher respect. These scales were assumed to be interval level. The indicator for preference for how agreements are reached was nominal level.

Student and teacher interview schedules were found content and face valid by a panel of experts. A BAS class from a fifth student teacher placement center was used for piloting instructional materials and procedures, and for determining instrument reliability. Cronbach's alpha reliability coefficient for the instrument was .77.

ANALYSIS OF DATA

Five students, selected randomly from each BAS class, and four teachers participated in clinical interviews within 30 hours following the treatment. The interviews took place in an isolated room during study hall and preparation periods. Interviews ranged from 30 to 40 minutes in length. They were audiotaped and transcribed for data analysis. Responses to preference/opinion indicators were analyzed quantitatively using descriptive statistics. Student and teacher comments on preference/opinion indicators provided a qualitative dimension to the study.

RESULTS

Eight students and one teacher preferred transactional student/teacher participatory interaction during group problem solving (Table 1). Six students and two teachers preferred moderately student-dominated student/teacher participatory interaction. Student and teacher comments were:

1. Transactional - student: "If it was dominated by the teacher then you wouldn't learn as much, and if it was dominated by the students, you'd go off in wrong directions."

2. Transactional - student: "He [the teacher] could help us solve the problem, but we could decide if we wanted it that way."

3. Moderately student dominated - student: "If its our project, then we should do it."

Table 1
Preference for Overall Student/Teacher Participatory Interaction

Coded Value	Interaction Preference	Students (F)	Teachers (F)
1	Highly Teacher Dominated	1	0
2	Moderately Teacher Dominated	2	0
3	Slightly Teacher Dominated	0	0
4	Transactional	8	1
5	Slightly Student Dominated	3	1
6	Moderately Student Dominated	6	2
7	Highly Student Dominated	0	0
	Doesn't Matter	0	0
Totals (N)		20	4

4. Transactional - teacher (Class 2): "I'd prefer it to be slightly student dominated, but I know the reality of the situation won't allow that right now."

5. Slightly student dominated - teacher (Class 4): "In some groups it ought to be even higher than what I checked, but I feel with [this group] I still have to be involved to keep them headed in the right direction."

6. Moderately student dominated - teacher (Class 1): "Students do a lot better if they do it themselves, if they participate, and if they see a need...They're not bored from me [the teacher] talking all the time."

7. Moderately student dominated - teacher (Class 3): "I think you need to have the students participating in order to stay interested."

Fourteen students and two teachers preferred student/teacher transaction in decision making during group problem solving (Table 2). Five students and two teachers preferred student dominated decision making. Comments were:

1. Transactional - student: "Then we can get the teacher's point of view and he can get our point of view on the decision."
2. Transactional - student: "He [the teacher] knows what we're doing right. We might not be right all the time and he can help us out."
3. Transactional - teacher (Class 1): "The role of the teacher is to be there to guide and help out; and unless they [the students] are a really well educated group of people, their decision might not be based on facts and in the right direction."
4. Transactional - teacher (Class 2): "Because I have more knowledge in certain areas than they do and I can contribute a lot more realistic answers. I'd prefer it to be an advisory role, but it appears I must take a more active role in it."
5. Student dominated - teacher (Class 3): "I think the students will have less frustration than if I pick it and say 'here...now you do it.' I think they feel more ownership of the problem and they work harder at it."
6. Student dominated - teacher (Class 4): "The more of the decision that they can make, the better they're going to be in terms of the learning process as well as the better they're going to work on the problem or solution that they choose."

Table 2
Preference for Student and Teacher Participation in Decision Making

Coded Value	Decision Making Preference	Students (F)	Teachers (F)
1	Teacher Dominated	0	0
2	Transactional	14	2
3	Student Dominated	5	2
	Doesn't Matter	1	0
Totals (N)		20	4

Eight students preferred student/teacher transaction in discussion during group problem solving (Table 3). Seven students and all four teachers preferred student dominated discussion. Comments were:

1. Transactional - student: Everybody should contribute what they know"
2. Transactional - student: "We discussed it together. I liked that."
3. Student dominated - student: "Because there's more students [than teachers]."
4. Student dominated - student: "Because we have to think of ideas. The teacher can give us his, but we need to think of solutions ourselves."

Table 3
Preference for Student and Teacher Participation In Discussion

Coded Value	Discussion Preference	Students (F)	Teacher (F)
1	Teacher Dominated	2	0
2	Transactional	8	0
3	Student Dominated	7	4
	Doesn't Matter	3	0
Totals (N)		20	4

5. Student dominated - teacher (Class 1): "If they come up with the discussion, then they're more apt to remember it."

6. Student dominated - teacher (Class 3): "The more they're talking, the more I can monitor what the students are learning or thinking. If they're thinking wrong or off target, I can bring them back to the task; and if they're thinking on target, I can reinforce it."

7. Student dominated - teacher (Class 4): "Its important, since its a group decision making process, that they dominate discussion...have as much input as possible...with a little guidance on my part; as little as possible."

Four students preferred teacher dominated leadership during group problem solving (Table 4). Eight students and one teacher preferred transactional student/teacher leadership. Six students and three teachers preferred student dominated leadership. Comments were:

1. Transactional - student: "To make a team, they both should have a chance to lead."

2. Transactional - student: "If the power were right in the middle, then you'd be using the right ideas and heading in the right directions."

3. Student dominated - student: "If we know what we want to do, then we should be leading it, not telling him what we want to do and having him do it for us."

4. Student dominated - student: "It gives us practice leading a group."

Table 4

Preference for Student and Teacher Participation in Leadership

Coded Value	Leadership Preference	Students (F)	Teacher (F)
1	Teacher Dominated	4	0
2	Transactional	8	1
3	Student Dominated	6	3
	Doesn't Matter	2	0
Totals (N)		20	4

5. Transactional - teacher (Class 1): Unless its a situation where the students really know what is going on, then the teacher has to take some sort of leadership role to get it started and set parameters."

6. Student dominated - teacher (Class 2): "That's the whole purpose of our ag ed program."

7. Student dominated - teacher (Class 3): "It gets them more involved."

8. Student dominated - teacher (Class 4): "If they're going to learn and benefit through the process of problem solving, they need to provide as much leadership as they can. It would be ideal if they could provide all of the leadership; but I don't think, again in a group like this, that you can just give the problem and assign a leader and say 'come back with a solution'."

Ten students and three teachers preferred reaching agreements by consensus during group problem solving (Table 5). Six students and one teacher preferred voting. Comments were:

1. Consensus - student: "Its easier. You don't have to have somebody count it."

2. Consensus - student: "Everybody should like it, not just one person. If you see somebody's hand up there, you're going to vote with him if you like him."

3. Consensus - student: "You get to see what everybody thinks. You get somebody [during voting] that just raises his hand for anything and you dont know what he thinks about it."

4. Consensus - student: "In this problem solving, voting seems a little bit strict."

5. Voting - student: "If a class leader stands up and says to everybody, 'would everybody like to have this,' most people would just say yes instead of everybody getting a chance to vote on it."

6. Voting - student: "You can have a conflict [with consensus]."

7. Voting - student: "With voting, you can find out what everybody else likes and see why they liked that."

Table 5

Preference for How Agreements Are Reached

Agreement Preference	Students (F)	Teacher (F)
Voting	6	1
Consensus or Voting (depends on the situation)	3	0
Consensus	10	3
Doesn't Matter	1	0
Totals (N)	20	4

8. Consensus - teacher (Class 1): "There's always this thing about when you vote, there's always somebody that loses."

9. Consensus - teacher (Class 2): "It seems to be a more democratic arrangement."

10. Consensus - teacher (Class 4): "You're probably going to wind up with a vote even though I would prefer that everybody agree."

11. Voting - teacher (Class 3): "If you go with group consensus, you can take a group of 16 and have four kids who are so dominant that they convince the other kids."

Five students and one teacher indicated that mutual student/teacher respect was moderately important during group problem solving (Table 6). Fifteen students and three teachers indicated it to be highly important. Comments were:

1. Highly important - student: "If one of us has an idea and the other one doesn't listen, you're not going to get much accomplished."

2. Highly important - student: "You have to have respect for each other for a team."

3. Highly important - student: "You get sent to the office [without mutual respect]."

4. Highly important - student: "But you can't like the teacher so much and use all his ideas. If you conform to somebody, its not your idea, and if its not your idea, you probably won't like it and then its not worth doing."

5. Moderately important - teacher (Class 2): "People won't believe each other if there's no respect for them."

6. Highly important - teacher (Class 1): "The teacher has to respect the decisions of the students in problem solving because the whole idea is to get the students involved and to get them to solve the problem."

7. Highly important - teacher (Class 3) : "Its important between students too. There were a couple of juniors in his group that looked down on John [a freshman].

There's not much respect there. He got frustrated with that. You have to have mutual respect in order to have a working relationship."

8. Highly important - teacher (Class 4): "If they don't respect the guidance that I try to give them, then I can see the possibility of them being completely unsuccessful. On the other hand,. if I don't respect the input that they're going to give to the decision in the problem solving activity, then it probably would be equally unsuccessful because they wouldn't be motivated to carry on something then they really didn't have an active part in decision making."

Table 6
Opinion on Student and Teacher Mutual Respect

Coded Value	Opinion on Mutual Respect	Students (F)	Teacher (F)
1	Not Important	0	0
2	Slightly Important	0	0
3	Moderately Important	5	1
4	Highly Important	15	3
Totals (N)		20	4

CONCLUSIONS AND RECOMMENDATIONS

Students most frequently preferred transactional student/teacher participatory interaction; student/teacher transaction in decision making, discussion, and leadership; agreements reached by consensus; and highly valued mutual student/teacher respect during group problem solving. Transactional comments valued teacher participation in or sharing of group responsibilities during group problem solving. Smaller numbers of students preferred student dominated student/teacher participatory interaction, decision making, discussion, and leadership; and agreements reached by voting. Comments from these students demonstrated valuing of student autonomy during group problem solving. Two of the same arguments (i.e., hearing everyone's opinion and nobody controls the agreement) were used by proponents of both consensus and voting. Either method, if handled properly, would realize these outcomes.

In contrast, teachers generally preferred student domination of student/teacher participatory interaction, discussion, and leadership during group problem solving. They preferred agreements reached by consensus, were split between transactional and student dominated decision making, and highly valued mutual student/teacher respect. Teacher comments generally favored student domination of group problem solving, especially for enhancing learning. Transactional comments were often apologetic that students could not handle more autonomy.

Student data further supports a transactional model for student/teacher participatory interaction during group problem solving in secondary school agricultural education; just as this model is substantiated for adult group problem solving situations (i.e., rural development and the work place). Teachers of agriculture could address the preferences of their students during group problem solving by attempting to achieve overall transactional student/teacher participatory interaction and transaction in the five areas mentioned by Nair and White (1987) whenever possible. Teachers must skillfully interact with students so that they are genuinely empowered in order to simultaneously address the preferences of more autonomous students. For example, teachers can get involved in decision making by providing vital information without making or forcing a decision.

Teachers educators could prepare teachers for group problem solving teaching by discussing how transactional participatory interaction in the five areas can be achieved and managed. Secondary school group problem solving curriculum could also incorporate these concepts and learning activities to achieve and manage them during group problem solving.

Replication of this study using a sample representing all secondary school grade levels is necessary to further validate and expand on these results.

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TRANSACTIONAL PREFERENCES OF STUDENTS AND TEACHERS DURING GROUP PROBLEM SOLVING

A CRITIQUE

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Strengths

Importance of the topic. The author chose an area of behavior and instructional technique of prime interest for those interested in teaching the skills of critical thinking. It is well that one chooses to probe into an area that is not so easily observed directly.

Inclusion of subjects' quotes. For each of five tables presented, the author presents quotes of subjects; those quotes enable understanding of the "classification" of subjects as "transactional," "teacher dominated," or "student dominated."

Standardizing pretreatment and interview activities. The author discussed awareness of and sensitivity to providing subjects with rudimentary skills to enable them to participate in the research effort. And, use of video recordings of interview of teachers and students after the treatment represents an innovative way to document the interviews.

Procedures. This section is lengthy, providing an opportunity to determine the complexity of the procedures and steps taken. The author carefully describes the population from which the sample was taken and how the sample was selected and used.

Suggestions for Improvements

Purpose and objectives. In view of the importance of research in the area of group dynamics in problem-solving situations, a serious inquiry should provide a basis for making comparisons. F. N. Kerlinger, has concluded that any research effort that doesn't have a legitimate comparison is "scientifically worthless." That is not to say that this study lacks practical significance. However, the profession is cool to embracing research efforts which lack scientific credibility. Purpose and objective lack a projection toward meaningful comparisons and the means to quantify and test relationships between independent and dependent variables.

Sample size. The author made no attempt to report any statistic other than "frequency counts." Therefore, one might question whether sample size can be fairly raised as an issue. Consider this: Vockell[1] writes that the confidence interval for a sample of n = 20 is **plus-minus 22 %**, a concern for most researchers accustomed to reading research with confidence intervals in the plus-minus 5%. It is important to note that the researcher reported several traditional and practical constraints which limited the size of the accessible population: proximity, teacher experience with PST, teacher agreement, and availability of a student population not yet experienced with a new offering from the State curriculum.

Data quantification and data reduction. Based on the written report available at the time of critique, traditional techniques for raising data levels beyond nominal and for quantification beyond frequency counts were unused.

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[1] Edward L. Vockell, Educational Research (New York: MacMillian Publishing Co., Inc., 1983) pp. 114 - 115.

EXPERIMENTAL EVALUATION OF AN ENVIRONMENTAL CONSERVATION TECHNOLOGY INSTRUCTIONAL UNIT

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INTRODUCTION

The social reconstructionist concept of curriculum development advocates confronting the learner with the severe problems facing humankind. Optimistic social reconstructionists are convinced that education can effect social change, and want a curriculum that challenges creative thought and looks at alternate ways of accomplishing missions (McNeil, 1985). A problem of major concern both on a global and national level is the conservation of natural resources and protection of the environment. Agriculture is a major contributor to soil erosion and non-point sources of groundwater pollution. It has been argued that modern, intensive, high input agricultural systems cannot be sustained at current production levels without a negative impact on the environment. Some suggest a "revolutionary" approach under the banner of sustainable agriculture rather than current production systems. A new vision for agricultural production is that the 1990's will be the decade of the environment (Barrick, 1989).

If there is to be a change in public awareness of and commitment to environmental conservation, there must be movements toward changing public values and stimulating positive decision making by the public concerning conservation issues (Allison & Carrington, 1980). The need for curriculum addressing environmental conservation has been identified by numerous authors (Ferguson, 1990; Robins, 1989; Bentley, 1986; & Loomis 1986 to name a few). It has been said that "The best interests of Americans lie in providing students with a curriculum that is fixed on the future--on what is possible" (McNeil, 1985, p. 4).

A continual question asked by educators in agricultural education is how to respond to both the need for a curriculum addressing environmental conservation and the needs of students who must prepare for the technological careers of tomorrow. More investments in the educational system are needed to develop the knowledge base necessary for technological improvements with minimal adverse impact on the environment.

Following the reconstructionist concept of curriculum development, an environmental conservation technology instructional unit was developed to address a pressing global and national issue, and incorporate innovative scientific technologies to stimulate learning and increase student knowledge of environmental conservation. The unit focused on technologies, including biotechnologies, that have utility in managing and conserving natural resources and restoring the environment.

Education is the process of changing the behavior of people. To accomplish this process volumes of curriculum materials have been developed and disseminated to assist teachers in this change process. However, many of these instructional materials do not undergo an evaluation to determine if they are accomplishing their objectives (McCormick & Cox, 1988). The development of a curriculum to meet the changing needs of students and society, is not an end in itself, but part of a continuing process. The need for extensive evaluation of the curriculum is an important step in this continuum. Ralph Tyler (1949, p. 105) advocated that ". . . many variables make it impossible to guarantee that the actual learning experiences provided are precisely those that are outlined in the learning units." Tyler went on to say that "it is important to make a more inclusive check as to whether these plans for experiences actually function to guide the teacher in producing the sort of outcomes desired." Evaluation is the process for finding out whether the curriculum is actually producing the desired results. Evaluation, if designed adequately, will identify strengths and weaknesses within the curriculum. "As a result of evaluation, it is possible to note in what respects the curriculum is effective and in what respects it needs improvement" (Tyler, 1949, p. 105).

PURPOSES AND OBJECTIVES

An experiment was conducted during the 1989-1990 school year to evaluate the effectiveness of an environmental conservation technology instructional unit. The instructional unit was designed for upper level high school agriculture students. The effectiveness of the unit was measured in terms of students' knowledge of environmental conservation technology, students' attitude toward natural resources, and teachers' attitudes toward natural resources and teaching environmental conservation technology. The primary objective of the study was to determine if: significant differences existed between the experimental and the control groups with regards to student knowledge of environmental conservation technology, student attitude toward natural resources, and teacher attitude toward natural resources and teaching environmental conservation technology. A secondary objective was to identify independent variables contributing to student environmental conservation knowledge and natural resources attitude scores.

PROCEDURES

Methodology, Population, and Sample: Evaluation of the environmental conservation technology instructional unit was based on an experimental pretest-posttest control group design. Schools with agriculture departments were randomly selected and randomly assigned to two groups from a population of 82 schools within an 80 mile radius of Iowa State University. Because a cluster sampling technique was used, the school was the experimental unit in this study. The experimental group received the instructional unit and an inservice education program on the use of the instructional unit; the control group received only a list of environmental conservation technology lesson titles and objectives to guide their teaching. (The lesson titles and objectives received by the control group were not considered a treatment in this study.)

Instrumentation: Instruments were developed to measure the dependent variables and to record personal and situational data. Three instruments were developed to measure student variables: an agriculture student information sheet, an agriculture student natural resources pre and post attitude inventory, and an agriculture student environmental conservation technology pretest and posttest composed of technology and natural resources subscales. The student attitude inventory was used as a pretest and posttest measure of student attitudes toward conservation of natural resources. The attitude scale consisted of 30 statements modified from an agriculture student natural resources instrument used in 1988 by Whent and Williams. The instrument was field-tested during the fall of 1987. Analysis revealed a reliability (coefficient alpha) of .80. Selected items were modified or rewritten by the project team. The instrument was designed to elicit a response of agreement or disagreement to items using a 9-point Likert scale.

An objective-referenced test of 35 multiple-choice items with four alternatives each was used to assess student knowledge about environmental conservation technology. The test was used as a pretest and a posttest, with items arranged in a different order during each administration. Test items were developed by the researcher. To ensure proportional coverage of instructional materials by test items, one item was included for each learning objective in the instructional unit. The test was reviewed by project staff and an agriculture teacher for content validity. The instrument was field-tested by thirty agriculture students in a school not participating in the experiment. Distractor and item analysis and reliability measures were generated from these data.

The field-test yielded a KR-20 reliability coefficient of .76. Items for the agriculture student natural resources test were selected with an item difficulty between 30 and 70 percent and an item discrimination value above .20. Items with low discrimination values were rewritten. The test consisted of 35 typed items, reproduced similar in design to a teacher-made test to achieve face validity.

An agriculture teacher natural resources pre and post attitude inventory was also developed to measure teacher's attitudes toward natural resources conservation and attitudes toward teaching environmental conservation technology. The inventory was administered as a pretest and posttest. Teachers were asked to respond to 35 statements using a 9-point Likert scale (identical to that in the student natural resources attitude inventory). The teacher attitude inventory consisted of two subscales, one subscale consisted of 29 items developed to measure attitudes toward natural resources, a second subscale consisted of six items developed to measure teacher attitude towards teaching environmental conservation technology. Items on the first subscale were identical to the first 29 items on the student attitude inventory.

Data Collection: In order to ensure equal treatment of groups, pretest and posttest instruments were mailed to both groups along with detailed directions. Mailing for both groups occurred concurrently. Teachers in both groups were asked to administer the pretest the day before beginning instruction for the experiment, and mail all pretest materials to the researcher immediately after the pretesting. Posttest materials were mailed to teachers before their projected completion dates. The experiment, including pre and post testing, was to be completed during a three-week period. The study included 18 schools in the experimental group with 144 students and 18 teachers, and 16 schools in the control group with 122 students and 16 teachers.

ANALYSIS OF DATA

Data were analyzed using SPSSx statistical package for the social sciences. Only completed data from students, taking both the pretest and posttest were used in the analyses. Individual student scores were used to generate school means. Dependent variable data gathering instruments, including the pretest and posttest forms of the attitude inventory and the agriculture student knowledge test, were analyzed for reliability. Coefficient alpha, used to estimate reliability for items using an interval scale, was employed to estimate the reliability of the attitude instruments. An estimate of reliability was made using the Kuder-Richardson Formula 20 for the categorical items on the knowledge test and subscales. Item analysis measures including item difficulty and item discriminating power were also measured. Descriptive statistics and analysis of covariance were used to analyze data on the student and teacher attitude inventories. Counts and frequencies were tabulated for student, teacher, and class variables. Chi-square analyses were used for tests of independence and t-test analyses were used to determine differences between groups regarding personal and situational variables. Analyses of covariance were used to determine differences between groups using pretest scores as a covariate. Paired t-test analyses were employed to determine differences between pretest and posttest results within groups. Stepwise regression analyses were used to identify specific student and teacher independent variables which contributed to student posttest scores, and student and teacher attitude scores.

RESULTS

Description of Sample: A majority of the student population was white male. Only three percent of the sample were minority students, and thirteen percent were female. Approximately five percent of the students were identified by their teachers as having severe learning disabilities. Fifty-eight percent of the students enrolled in agriculture classes lived on farms, an additional 11 percent lived in rural areas, but not farms, and the remaining 31 percent live in towns and cities.

Instrument Characteristics: The reliability coefficient (KR-20) was .82 for the knowledge pretest and .89 for the knowledge posttest. The natural resources subscale provided a reliability coefficient of .78 and .84 for pre and post tests, respectively. The technology subscale provided a reliability of .62 and .71. A KR-20 A reliability estimate using Cronbach's coefficient alpha provided a measure of .77 for both pretest and posttest of the student natural resources attitude inventory. The teacher natural resources attitude inventory was divided into two subscales. A Cronbach's alpha reliability analysis of the teachers natural resources subscale attitude inventory revealed .61 and .74 for the pretest and posttest, respectively. Pretest and posttest analysis of the attitude inventories measuring teacher attitudes toward teaching natural resources revealed a Cronbach's alpha reliability measure of .81 and .85, respectively.

Student Knowledge of Environmental Conservation Technology: The findings revealed that the instructional unit and inservice education program were effective in increasing student knowledge of environmental conservation technology. Further analysis revealed significant differences between groups on the technology subscale of the knowledge test. Groups were not significantly different on the natural resources subscale of the knowledge test. The results of these analyses are presented on Table 1.

Table 1. Analysis of covariance for knowledge scores of groups, using the pretest as a covariate

Source of Variation	DF	Sums of Squares	Mean Square	F-value	Probability
Covariates pretest response	1	46.15	46.15	5.25	.03
Treatment adjusted for covariate	1	47.97	47.97	7.78	.01
Error	31	191.07	6.16		
Natural resources subscale					
Covariates pre natural resources	1	1.11	1.11	.91	.35
Treatment adjusted for covariance.	1	11.05	11.05	2.62	.12
Error	31	130.56	4.21		
Technology subscale					
Covariates pre technology	1	45.62	45.62	53.51	.00
Treatment adjusted for covariance.	1	9.90	9.90	11.61	.00
Error	31	26.43	.85		

Analyses of pretest and posttest scores within the two groups revealed that the experimental group significantly increased in knowledge of environmental conservation technology. Increase in knowledge by the control group was not significant. Breakdown of the knowledge test into technology and natural resources subscales revealed that both experimental and control groups significantly increased in knowledge from pretest to posttest on the technology subscale. However, only the experimental treatment group increased in knowledge from pretest to posttest on the natural resources subscale. The results of these analyses are presented on Table 2.

Table 2. Paired t-test analyses of pretest and posttest knowledge scores by group and subgroup

Treatment group	n	Pretest mean	SD	Posttest mean	SD	t-value	Probability
Experimental	18	19.78	3.35	23.26	3.53	7.45	.00
Control	16	17.44	2.45	18.61	3.70	1.60	.13
Experimental Group (Raw Scores)							
Natural resources subset	18	13.73	2.49	15.30	2.41	3.80	.00
Technology subset	18	6.04	1.12	7.97	1.26	11.41	.00
Control Group (Raw Scores)							
Natural resources subset	16	12.19	2.21	12.50	2.63	.52	.61
Technology subset	16	5.44	1.04	6.08	1.29	2.67	.02

Student Attitudes Toward Natural Resources: The instructional unit was unsuccessful in significantly changing student's attitude toward natural resources. Significant changes in attitudes were not observed between experimental and control groups, nor were significant changes observed within groups between pretest and posttest scores. Other instructional materials evaluation efforts, using attitudes of secondary agriculture students as a dependent variable, observed similar results (Hosseini, 1983; Birkenholz, 1982).

Independent Variables Contributing to Student Knowledge: In an attempt to explain the variations in knowledge and attitude scores, stepwise multiple regressions were performed to identify student, teacher, and class variables which contributed to student outcomes. Only two student variables were observed to be good predictors of student knowledge. The number of semesters students have participated in FFA and the number of semesters students have participated in soils and crop judging teams were significant contributors to student achievement. These findings, presented on Table 3, are not surprising. Previous studies have found a relationship between student performance on criterion-referenced tests and active participation in FFA activities (Whent & Leising, 1988; Whent & Williams, 1988; & Kotrlik, Parton, & Lelle, 1986).

Stepwise regression between teacher and student post scores identified one teacher variable significantly contributing to student achievement on both the knowledge test and the natural resources subscale of the knowledge test with an associated variance of approximately 20 percent. This variable was a teacher's (positive) attitude toward teaching natural resources.

Table 3. Stepwise regression analyses of teacher pretest attitudes toward teaching natural resources and student posttest scores.

Variable	Beta	Multiple R	Adjusted R^2	Probability
Environmental conservation technology test				
Mean attitude of teachers toward teaching natural resources and technology (pretest)	.44	.44	.17	.01
Natural resources subset test				
Mean attitude of teachers toward teaching natural resources and technology (pretest)	.49	.49	.22	.00

Table 4. Stepwise regression analysis of selected student variables and natural resources attitude scores

Variable	Beta	Multiple R	Adjusted R^2	Probability
Pretest attitude inventory				
Semester of FFA soil & crops judging teams	.21	.21	.03	.00
Rare FFA involvement	-.16	.26	.06	.00
Total SAE programs	.13	.29	.07	.00
Posttest attitude inventory				
Semesters of agriculture instruction	.24	.24	.05	.00
High FFA involvement	.15	.28	.07	.00
Gender (boy)	-.17	.33	.10	.00
Grade in school	.18	.37	.12	.00
Semesters of FFA soil & crops judging teams	.14	.38	.12	.00

Independent Variables Contributing to Student Attitude: Stepwise regression analyses revealed student variables which predicted student pretest and posttest attitude scores. Student variables which predicted pretest attitude scores included: semesters of FFA soil and crops judging team participation, and number of SAE programs. Student variables which predicted posttest attitude scores included: semesters of agriculture instruction, high involvement in FFA, gender being male (negative contribution), grade in school, and semesters of FFA soil and crops judging team participation. This analysis is presented on Table 4.

CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

The environmental conservation technology instructional unit and teacher inservice program were effective in developing student knowledge of technologies that can be used to conserve natural resources and protect the environment. Semesters of FFA membership and semesters of soils and crop judging team participation significantly contributed to student achievement on the environmental conservation technology knowledge test. Teacher attitude toward teaching natural resources was a predictor of student posttest scores. Student participation in FFA soil and crop judging teams, involvement in FFA, and number of SAE programs contributed positively to pretest attitude scores. Similarly, semesters of agriculture instruction, FFA involvement, gender, grade in school, and semesters of participation in FFA soil and crop judging teams contributed to student posttest attitude scores. Students comprising the population came from both rural and urban settings.

Based on these conclusions, the following recommendations were made. Instructional materials about conservation of natural resources should address the needs of both rural and urban students enrolled in agricultural education classes. Based on the positive attitudes females had toward conservation of natural resources; female participation in agriculture programs should be encouraged. Students should be encouraged to join the FFA, participate in soils and crop judging teams, and initiate SAE programs incorporating natural resources components. New instructional materials must be concerned with stimulating teacher interest and increasing the teacher's knowledge of the subject area as well as the student's knowledge.

Teaching materials, inservice sessions, and preservice programs should also address the need to instill positive teacher attitudes toward teaching environmental conservation. Inservice on the use of instructional materials, especially materials introducing new or difficult technological concepts, should be a part of the dissemination process. With minor changes, the environmental conservation technology instructional unit should be disseminated to agriculture teachers.

The effect of FFA participation and semesters of soils and crop judging experience should be investigated further. Investigation is needed to determine the specific areas of FFA participation that contribute to student achievement. Further study is also needed to investigate the causal relationship between teacher attitude (positive) toward teaching natural resources and student posttest knowledge success. Follow-up of students in this experiment to determine the long-term effects on environmental conservation technology knowledge and attitudes is suggested. Further study is needed to determine the effect of teacher inservice in contributing to the success of instructional materials emphasizing new or unfamiliar technologies.

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EXPERIMENTAL EVALUATION OF AN ENVIRONMENTAL CONSERVATION TECHNOLOGY INSTRUCTIONAL UNIT

A Critique

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Overview. Design, instrumentation and analysis significantly contribute to internal validity of a study which assessed impact of a new instructional unit in environmental conservation. This study represents a good example of a scholarly approach to a question of practical significance in curriculum and instruction.

Purposes and objectives. The authors sought to determine differences, if any, between experimental groups for four dependent variables dealing with teaching and learning of environmental conservation: (1) student knowledge..., (2) student attitude..., (3) teacher attitude toward natural resources, and (4) teacher attitude toward teaching.... Secondly, they sought to identify independent variables "contributing" to student knowledge and attitudes. The authors did not project hypotheses for testing; therefore, there is no procedural requisite for justifying selection of the variables under study. However, one could come to the conclusion that most of the dependent variables were selected to conform to characteristics of an existing instrument.

Effects of design. Pretest-posttest control group design inherently controls most threats to internal validity. The researchers are commended for applying the design in the school setting, a departure from norms. (Perhaps use of posttest only control group design would have been a good alternative design.) Concern *may* arise for some: possibility of confounding "leakage" of information from some of the schools to others in the geographic area of 80 miles radius, perhaps tainting the results from some schools; the Hawthorne effect is a distinct threat. Campbell and Stanley (1963) warn ". . .for all we know, the effects of X observed may be specific to groups warmed up by the pretest (p. 17)."

Method, population and sample. The researchers are commended for rightly using *schools* as experimental units, n = 34 schools from an accessible population of 82 schools. Perception of the study's strengths would be more positive if the authors had indicated how the sample was selected from the 82 accessible schools and how the schools were invited to participate in the experiment and the "in-service training." (Nothing is said of how the 34 schools were selected from the 82, casting doubt on similarities of the 34 schools to the 82.) The population and resulting sample appear to be sampling by convenience. Methods used for collecting and analyzing student data are appropriate, with ANCOVA rightly used in conjunction with pretest. Instrument had good numbers: alpha = .80; KR_{20} coefficient of .76; item discrimination > .20; item difficulty between 30 and 70 percent. The teacher attitude inventory used 29 items from the field-tested student-instrument; six items for the subscale teacher attitude toward teaching the subject were reportedly analyzed: alpha = .81 and .85 for pretests and posttests.

Literature and construct. The authors cite two literature areas: rationale for the topic and foundations of curriculum development. Because the authors used both bodies of literature, they build credibility for the need of the study. However, the authors have overstated their research by conclusions which encourage "...join FFA, participate in soils and crop judging teams, and initiate SAE programs incorporating natural resources components. If literature were cited which laid foundation for this construct, acceptance would be easier. Although significant correlation was indicated, the study and data do not provide a basis for what appears to be acceptance of "cause and effect" relationship.

ANALYSIS OF TWO TEACHING METHODS USED IN AN EXTENSION HOME VEGETABLE GARDENING PROGRAM

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From its inception, the task of the Cooperative Extension Service has been to influence people through educational programs to use new technology to improve their quality of life. Technically competent extension workers must become familiar with basic educational concepts and learn how to apply them in practical situations. Additionally, extension workers must become skilled in a wide variety of teaching methods, so they can select the best single one or a combination of several that will get across a particular message to an individual or a group in the most efficient and effective manner possible (Prawl, Medlin and Gross, 1984).

Throughout history, Extension has relied heavily on result demonstrations to disseminate information. From the first result demonstration in 1903 until present time, this method of teaching has proved time and time again to be invaluable in transferring knowledge to the intended audience. In conjunction with the result demonstration, other early forms of Extension teaching that are still valuable are educational meetings, workshops, seminars, group discussion, correspondence study, telephone conversations, and farm visits (Boyle, 1981; Gantt & Terrell, 1986; Kristiansson, 1981).

The efficiency and effectiveness of extension workers will be enhanced if the best delivery systems are used. As communities and clientele change and budgets become tighter, a knowledge of system effectiveness becomes increasingly important. The focus of this study was two program delivery methods, correspondence study and illustrated lecture.

Correspondence instruction is a method of individualized instruction where the mail is the means of communication between the learner and the instructor. Houle (1965), specified the following components of correspondence instruction:

> specially prepared materials, written in self explanatory fashion and arranged in a series of lessons; supplementary printed and other material relating to the course; a series of lessons to be worked out by the student; the evaluation of these exercises by a competent instructor with the learner being informed of the evaluation. (pp. 544-545)

The types of correspondence programs offered through the Cooperative Extension Service are as varied as the clientele it serves and include subjects such as nutrition, home vegetable gardening, home furnishing, home canning, estate planning, water conservation, and community hygiene (Bradshaw, 1988; Dorschel, 1981; Kristiansson, 1981; Gantt & Terrell, 1986; Goetingg, 1981).

Illustrated lecture is a method of group instruction in which an informative talk is delivered to a class using illustrations in the form of examples, booklets, pictures, diagrams, and so forth to help clarify the lecture content (Newcomb, McCracken & Warmbrod, 1986)

PURPOSE AND OBJECTIVES

The primary purpose of this study was to determine the effectiveness of two program delivery methods (illustrated lecture and correspondence study) in relation to the amount of knowledge gained by participants in a home vegetable gardening program. The secondary purpose was to determine if there was an association between method of instruction selected and the attitudes and descriptive attributes of program completers.

Specifically, the research hypothesis states that there will be a difference in the amount of knowledge gained between the program delivery methods of illustrated lecture and correspondence study pertaining to the home vegetable gardening program offered through the Pinellas County Cooperative Extension Service.

In addition to the primary hypothesis, the effectiveness of the two program delivery methods, two additional objectives of the study were:

1. To determine if the attitudes of participants about the program with respect to complexity, coverage, understanding, organization, practicality, interest, print size, usefulness, desire to learn more, enrollment ease, instructional ease, meeting of needs, learning aids, and illustrations were associated with the teaching method selected.

2. To determine if the attributes of program participants with respect to age, race, income, education, sex, residency status, employment status, number of dependents, resident county, transportation, area of residence within Pinellas County, and previous training in horticulture were associated with the teaching method selected.

PROCEDURES

The design used in this study was a nonequivalent self-selected comparison pretest-posttest design. Unlike the true experimental design where the researcher has full control through the use of randomization, this design uses intact groups and allows for the realization of neither full control over scheduling of experimental conditions or the ability to randomize.

The sample for this study consisted of participants in either a correspondence study or an illustrated lecture series of a home vegetable gardening program offered through the Pinellas County Cooperative Extension Service in the spring of 1989. The spring 1989 participants were considered to be a sample in time of participants. A comparative analysis between spring 1989 and fall 1988 participants was conducted in an effort to support the argument that spring 1989 participants were representative of all participants for the year. This analysis revealed that they were in fact demographically similar. The one difference was that previous participants tended to have a higher gross income level.

In order to obtain the required information, a pretest and a posttest were developed to ascertain the level of knowledge gained in both program delivery methods. In addition to assessing the knowledge gained by the vegetable gardening program participants, the demographic characteristics of the population with respect to age, sex, education, race, income, number of dependents, residency status (part-time or full-time), employment status, transportation, resident county, area of residence within Pinellas County, and previous training in horticulture were collected as part of the pretest. The perceptions of the participants concerning the program's content, structure, and implementation were collected on the posttest.

Based on the results obtained from a field test, the pretest and posttest questionnaires were revised to improve clarity, content, and ease of use. A Kuder-Richardson 20 statistical reliability analysis indicated an internal consistency of .92.

The questionnaires were administered through the mail for the participants in the correspondence study, "Vegetables Galore: Grow Your Own", and were enclosed in the first and last phase of the correspondence study along with a brief statement concerning the importance of the study.

For participants in the illustrated lecture "Vegetable Gardening", the same questionnaires were used as in the correspondence study series with the exception that the pretest was administered prior to the beginning of the first class and the posttest was administered at the close of the last class. The illustrated lecture series and the correspondence series contained identical information. There were 64 potential program completers and 64 (100%) of the participants actually completed the series. The correspondence study had 106 potential program completers and of these participants 61 (58%) actually completed the series by July, 1989. Of the 61 program completers 43 (71%) responded to the posttest questionnaire.

A comparison of the 43 respondents to the non-completers and non-respondents revealed that they were similar on all demographic characteristics. Additionally, the two groups were not significantly different on the pretest.

Items responses were descriptively analyzed for frequencies, percents, and means. Comparisons were made between selected attitude factors and demographic characteristics using Chi-square statistics. A t-Test was used to determine if there was a difference in the overall mean change score for the two methods of teaching. The decision level for all statistical tests was $p<.05$.

FINDINGS

The primary hypothesis was that there will be a difference in the amount of knowledge gained between the two program delivery methods. Table 1 summarizes the pretest and posttest scores for participants in the illustrated lecture and correspondence series. For the illustrated lecture group, pretest scores ranged from 0 to 93 and posttest scores ranged from 54 to 100. For the correspondence group, pretest scores ranged from 0 to 93 and posttest scores ranged from 57 to 100.

Table 2 summarizes the change scores for the two groups. Change scores for the illustrated lecture group ranged from less than 0 to 96. The overall mean change score for the illustrated lecture group was 33.4. Change scores for the correspondence group ranged from less than 0 to 82. The mean change score for the correspondence group was 17.9.

A t-Test was used to test the null hypothesis that there will be no difference in the amount of knowledge gained between the two methods. The results indicated that there was a significant difference ($p<.05$) between the mean change scores for the illustrated lecture (33.5) and correspondence (17.9) groups. Therefore, the null hypothesis was rejected.

It should be noted that even though the illustrated lecture group had significantly higher gain scores, the correspondence group scored significantly higher on both the pretest and the posttest.

OBJECTIVE ONE

Objective one was designed to determine if the participants in the correspondence study and illustrated lecture differed concerning their attitudes about the content and delivery of the home vegetable gardening program. Each of the program attitude questions was answered yes, no or undecided. A total of 18 questions were asked related to program content, program structure, and program implementation. Specifically, these questions related to complexity of program content, ease of understanding program content, coverage of program content, organization of the program content, practicality of the program content, interest held by the program content, desire to learn more about program content, usefulness of the program content, degree that program content met needs, instructional ease, ease of enrollment, helpfulness with problems and/or questions, and attitudes about program implementation.

Table 1

Summary Statistics for Pretest and Posttest

Raw Score	Illustrated Lecture		Correspondence	
	Pretest	Posttest	Pretest	Posttest
0	4	-	2	-
1-10	10	-	-	-
11-20	3	-	-	-
21-30	1	-	-	-
31-40	4	-	1	-
41-50	7	-	4	-
51-60	5	5	3	1
61-70	13	9	9	3
71-80	10	18	11	5
81-90	5	18	11	19
91-100	1	14	2	15
Mean	46.4	79.8	69.9	86.2
SD	29.5	12.1	16.7	10.8

Table 2

Summary Statistics for Change Scores

Change Score	Illustrated Lecture N	Correspondence N
< 0	8	4
0	2	3
1-10	9	8
11-20	9	13
21-30	5	7
31-40	9	5
41-50	4	1
51-60	3	-
61-70	4	-
71-80	5	-
81-90	4	1
91-100	3	-
Mean Change Score	33.5	17.9
SD	31.5	20.1

Findings indicated that there was an association between the degree to which participants wanted to learn more about vegetable gardening and teaching method selected ($X^2 = 25.46$, $p<.05$). The illustrated lecture respondents were more likely to want additional information. There was also an association between the respondents perceptions of Extension's helpfulness and method of teaching selected ($X^2 = 49.18$, $p<.05$). Illustrated lecture participants were more likely to believe that the Extension office is responsive to questions. There was not an association between teaching method selected and the other attitude questions.

OBJECTIVE TWO

The purpose of objective two was to determine if there was an association between program delivery method and the following demographic variables: age, race, income, education, residency status, sex, employment status, number of dependents, transportation, resident county, area of residence within Pinellas County, and previous horticultural education. Findings indicated that there was an association between teaching method selected and race ($X^2 - 5.23$, $p<.05$) with non-whites more likely to enroll in illustrated lecture.

There was also an association between educational level and method of teaching selected ($X^2 = 9.67$, $p<.05$). The correspondence respondents tended to be more highly educated. There was not an association between method of teaching and sex, age, residency status, income, and number of dependents.

CONCLUSIONS

1. The illustrated lecture method yielded a higher change in scores between the pretest and posttest than did the correspondence method.
2. Both methods of program delivery appeared to be effective in reaching the public as evidenced by higher posttest scores for both groups.
3. Respondents in each of the two program delivery methods possessed essentially the same attributes; however, respondents in the correspondence study tended to have a higher level of education and were primarily white, while non-white respondents tended to participate in the illustrated lecture series.
4. Illustrated lecture respondents had a greater interest in learning more about home vegetable gardening than did correspondence study respondents.
5. More illustrated lecture respondents believed that the Extension office was responsive to questions or problems than did correspondence study respondents.

RECOMMENDATIONS

Based on the findings and conclusions drawn from this study, the following organizational and further study recommendations are considered appropriate:

ORGANIZATIONAL

1. The results of this study should be made available to Extension administrators, Extension agents, and other individuals responsible for planning and providing educational programs.
2. Extension educators should consider utilizing correspondence study as a method to deliver programs.
3. Similar studies should be conducted in other programming areas and in other counties throughout the state to further understand the populations of program participants.

FURTHER STUDY

1. Further study should be conducted on this home vegetable gardening program, including the video program.

2. A study should be conducted to determine why more non-white potential participants are not participating in the series.

3. Further study should be conducted to define the population that the Pinellas County Cooperative Extension Service is actually reaching.

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ANALYSIS OF TWO TEACHING METHODS USED IN AN EXTENSION HOME VEGETABLE GARDENING PROGRAM

CRITIQUE

By Lloyd H. Blanton, Clemson University

Overview. Illustrated lecture and correspondence study were compared for their possible effectiveness upon knowledge level in home gardening. Context of the study is an on-going Extension program to deliver information. Results and generalization are limited to locale and subject matter described, although implications may be more widely ranging. Design is nonequivalent self-selected comparison pretest-posttest. While several threats to validity and other weaknesses may exist, first attempts to measure instructional effectiveness of Extension delivery systems *in situ* are of practical value.

Purpose and objectives. In proposing to determine effectiveness of two program delivery methods, the authors presented a research hypothesis (two-tailed) without presenting literature to support an hypothesis. Oversight of this requirement prejudices scientists' acceptance of the attributes of the study; scientists expect hypotheses to be based upon previous observations and/or literature. The objectives are reflective of the scope and purpose of the study and leads readers to fairly anticipate the kinds of relations studied, both associations and effects.

Procedures. The authors correctly described sample as self-selected, resulting in non-equivalent groups, and they presented descriptive evidence of the pretest differences between groups. Pretest scores were bracketed for presentation; distribution patterns, means and standard deviations were significantly different. Gain scores, from pretest to posttest, were compared using t-test (we don't know if the paired-subjects t-test was used) with gain scores significantly greater for the illustrated lecture group than for the correspondence group. The authors showed awareness of nonresponse problems by comparisons between respondents and nonrespondents, fairly concluding no significant differences for those variables studied.

Results and conclusions. Internal validity is seriously threatened in this study, and conclusions should be guarded about the "treatment" variable. Many intervening variables are likely threats and care should be exercised in assuming "cause and effect" relationships; a more likely approach for describing the data would focus upon relationships and associations such as the chi-square and correlations. Also, external validity is low. Conclusions number two (2), three (3), four (4) and five (5) appear to stretch well beyond evidence available in the abbreviated report available to the reviewer. Another suggestion: consider analysis of covariance since ANCOVA may be used to answer a question such as, "Would the posttest scores be different if the groups would have been equal to begin with?" Even though ANCOVA generally under-adjusts for pretest differences, it is fairly powerful in detecting differences in posttest scores related to the experimental conditions. In that case, a significant F-ratio would indicate that one delivery method produced different effects than the other, after substantial adjustment on the covariate.

TEACHERS' KNOWLEDGE AND ATTITUDES TOWARD PROBLEM-SOLVING TEACHING

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INTRODUCTION

The teaching of thinking skills in the public schools has received much attention over the past several years. Educators and the general public have begun to recognize the teaching of thinking as one of the most important aims of education (Elam, 1989). Problem solving is one type of major thinking strategy, consisting of a large number of micro-thinking skills (Beyer, 1987).

Problem-solving teaching (PST) is an instructional approach that mirrors the problem-solving processes used in scientific inquiry. A limited number of investigations have examined the effectiveness of problem solving as a teaching strategy, and results have shown that problem-solving teaching is generally as effective as other approaches and may be more effective in helping students retain more of what they learn (Flowers & Osborne, 1988). Problem-solving teaching has been widely promoted in agricultural education and has been shown in early works to be an effective teaching approach. Yet there has been serious concern that the use of problem solving teaching in agriculture has dramatically declined (Crunkilton, 1988).

The widely accepted Mitzel model for the study of teaching and learning (Dunkin & Bibble, 1974) suggests that student achievement is affected by teacher and student characteristics, contextual factors, and the processes of learning. Methods and techniques used by teachers primarily determine the nature of teaching/learning processes. Since preliminary research on problem solving teaching suggests that PST is an effective teaching approach, the factors that influence teachers to select this teaching method should be systematically explored. According to Newcomb, McCracken, and Warmbrod (1986), the selection of teaching method depends upon the nature of the topic, teacher objectives, time available, student characteristics, resource material available, and teacher preference. Research by Osborne and Hamzah (1989) indicated that prior experience with PST, confidence in using the approach, and attitude toward PST influence the extent to which teachers use problem solving teaching. The Mitzel model also suggests that teacher training experiences affect the nature of the teaching/learning process.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to examine knowledge of and attitudes toward problem-solving teaching (PST) as reported by Illinois high school agriculture teachers. Another phase of this study dealing with teachers' use of problem-solving teaching has already been reported in the professional literature (Osborne & Hamzah, 1989). The following research questions provided focus for this particular phase of the study:

1. How knowledgeable were Illinois secondary agriculture teachers regarding problem solving as a teaching approach?

2. What were the attitudes toward problem-solving teaching as reported by Illinois secondary agriculture teachers?

3. What was the relationship between teachers' knowledge and attitudes and selected demographic variables?

PROCEDURES

The research design implemented in the study was classified as descriptive correlational. The target population included all full-time Illinois agricultural production and agribusiness teachers during the 1987-88 school year (N=316). The LOTUS 1-2-3 spreadsheet program was used to select a simple random sample of 80 teachers, or 25% of the population. The sample size was determined using a formula suggested by Scheaffer, Mendenhall, & Ott (1979). Data were collected by use of a mailed questionnaire. Field testing and pilot testing resulted in several modifications of the instrument. A panel of experts consisting of four faculty members in agricultural education verified the content validity of the instrument. Twelve secondary agriculture teachers who were not selected for the sample provided pilot test data. The Kuder-Richardson 20 formula for examining the internal consistency of responses in Part 1, Teacher Knowledge of PST, yielded a reliability coefficient of .62. A Cronbach's Alpha reliability coefficient of .79 was calculated for the scale "Teacher Attitudes Toward PST".

After the initial mailing and two follow-up mailings, a 74% useable return was obtained. Late respondents were compared with early respondents, and no statistical differences were found between the two groups.

ANALYSIS OF DATA

Descriptive statistics were used to summarize and analyze the data. Possible relationships were examined using Pearson correlation coefficients. T-tests and analysis of variance were used to examine group differences. All hypotheses were tested at the .05 level.

RESULTS

Over 80% of the teachers completed four years of agriculture as a high school student. About one half (45.8%) of the teachers held a master's degree. Only 23.7% of the teachers had completed workshops or course work on problem-solving teaching since they first began teaching. The percentage of teachers reporting that 81-100% of their students participated in SAE programs was as follows: 9th grade - 64.4%, 10th grade - 62.7%, 11th grade - 52.5%, and 12th grade - 45.8%.

Teachers' knowledge of problem-solving teaching was examined using an eleven item multiple choice scale. Scores ranged from 4 to 11 (M=8.32, SD=1.74). (See Table 1.) T-test results showed no significant difference in teachers' knowledge scores and whether or not teachers had (1) taken agriculture in high school, (2) taken courses in problem solving teaching during their undergraduate program, and (3) completed course work or workshops on problem-solving teaching since they began teaching full-time. Analysis of variance procedures showed similar findings for years of teaching experience and highest degree held.

Teachers' attitudes toward problem-solving teaching were measured using a 20 item Likert-type scale (see Table 2). A five point scale was developed, ranging from (1) strongly disagree to (5) strongly agree. Teachers strongly agreed with the statement "one of the responsibilities of agriculture teachers is to help students develop the ability to think and solve problems" (M=4.66). Teachers agreed with ten other items, according to the item mean scores, and were uncertain or neutral in their attitudes on the remaining items. The range of scores for the 20 item summated scale was 52 to 98 (M=70.17, SD=9.25). Using the same independent variables as with the group comparisons on teacher knowledge, no statistical differences were found.

Negligible relationship were found between teachers' knowledge of problem-solving teaching and (1) use of PST and (2) attitudes toward PST. However, a substantial relationship was found between the use of problem-solving teaching and teachers' attitudes toward PST (r=.69, p<.0001). Other relationships were examined using Pearson correlation coefficients, as appropriate. Results showed that the more the respondents' cooperating teachers used PST, the higher the teachers' knowledge score (r=.25, p<.05). Attitudes toward PST were associated with emphasis given to PST by respondents' cooperating teachers (r=.40, p<.01), emphasis placed on PST by university supervisors during student teaching (r=.39, p<.01), use of PST as a student teacher (r=.42, p<.001), and current state of confidence in using problem-solving teaching (r=.57, p<.0001). A moderate relationship was also found between teachers' attitudes toward PST and the percentage of their students having SAE programs (r=.40, p<.01).

CONCLUSIONS AND RECOMMENDATIONS

1. After accepting full-time teaching positions, agriculture teachers seldom participate in workshops or courses that focus on problem-solving teaching. Traditionally, inservice activities deal primarily with topics in agriculture versus education in agriculture. Particularly with the current emphasis on teaching thinking skills in all curricula, more opportunities for teachers to participate in update sessions on PST should be provided.

2. Illinois agriculture teachers have a basic understanding of problem-solving teaching; the average score on the knowledge test used in this study was 75%. Teachers need to extend and further solidify their current knowledge base on PST.

3. Illinois agriculture teachers hold mixed attitudes toward PST as a teaching approach. Attitudes toward PST influence the extent to which teachers use problem-solving teaching in their classes. Therefore, teacher update and inservice sessions should address not only the "what" and "how" of PST, but also the "why" in an effort to help teachers develop a more positive attitude toward PST.

4. Student teaching is very important in shaping teachers' knowledge and attitudes toward PST. University supervisors and cooperating teachers should strongly support student teachers' efforts to use PST during student teaching.

5. The degree of self-confidence that teachers have in using problem-solving teaching is associated with their attitudes toward PST, which in turn is related to the extent to which they use PST. Preservice and inservice

programs should provide prospective and current teachers with as much supervised experience as possible in using PST in order to increase their confidence levels.

Recommendations for further research include:

1. Further examine teachers' knowledge of PST and their execution of various elements of PST in their classes. On-site observation of teaching should be performed to verify the extent to which teachers understand and use PST.

2. Identify the thinking skills inherent in the problem-solving approach to teaching. Examine the effectiveness of PST in strengthening these thinking skills in students.

3. Test the effectiveness of selected strategies for developing preservice and inservice teachers' knowledge base and performance skills in using PST. Factors that collectively form the confidence level that teachers have in their ability to use PST need to be identified and described. Strategies for improving such confidence should be tested.

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Percentage of Agriculture Teachers Giving Correct Responses on PST Knowledge Test

Table 1

Teacher Knowledge About Problem Solving Teaching

	Test Item	% teachers
1.	The first step in the problem solving process requires that students:	
	A. define the problem	18.6
	B. formulate possible solution	
	C. develop hypotheses	
	[✓ D.] experience a provocative situation	
2.	Problem solving as a teaching and learning process is analogous with:	
	A. brainstorming	62.7
	B. independent study	
	C. teacher-centered instruction	
	[✓ D.] the scientific method	
3.	As an approach or method of teaching, problem solving can best be described as:	
	A. subject matter instruction	81.4
	[✓ B.] discovery learning	
	C. teacher-centered instruction	
	D. a focus on principles	
4.	The teacher's role in problem solving teaching is that of a:	
	A. lecturer	76.3
	[✓ B.] leader	
	C. disseminator of knowledge	
	D. observer	
5.	The focus of instruction when using problem solving teaching is:	
	A. textbook material	40.7
	B. principles related to the content area	
	[✓ C.] problems experienced in agriculture	
	D. the teacher's knowledge base	
6.	When using problem solving teaching, the content of the lesson to be taught is based primarily upon:	
	[✓ A.] questions identified by students	86.4
	B. reference materials available	
	C. the Illinois Core Curriculum	
	D. the teacher's experience and knowledge	

7. In the problem solving mode of teaching students learn the "content" of a lesson by:

A. reading handouts and class notes 98.3
B. answering questions at the end of a textbook chapter
C. taking notes during a lecture
[✓ D.] seeking solutions to questions raised by students

8. When using problem solving teaching, teaching topics are organized into:

A. subject matter units 96.6
[✓ B.] problem areas
C. duty or job areas
D. job clusters

9. The essence of problem solving teaching dictates that students:

[✓ A.] inquire into solutions of identified problems 76.3
B. receive instruction pertaining to identified problems
C. develop a content outline for problem areas
D. enter into extensive class discussion and debate

10. Which of the following is the correct sequence of the major steps in problem solving teaching?

[✓ A.] interest approach, group objectives, problem and concerns, problem solution, application. 91.5
B. review, introduction, presentation, summary.
C. focus, questioning, problem selection, summary.
D. problems and concerns, problem selection, application, transfer.

11. In a problem solving format, if you were teaching students how to obtain credit for an agricultural business, the content of the lesson would be primarily defined by:

A. your judgement about what students should know 84.3
B. your experiences in obtaining credit
C. reference materials available
[✓ D.] questions raised by students

Mean number of correct responses = 8.32, SD=1.74

Table 2

Attitudes Toward Problem Solving Teaching Held by Agriculture Teachers

	Attitude Statements	Mean	SD
1.	One of the responsibilities of vocational agriculture teachers is to help students develop the ability to think and solve problems.	4.66	0.58
2.	Problem solving teaching forces students to be more active in the learning process than other approaches.	4.05	0.65
3.	A variety of teaching techniques may be incorporated into the problem solving approach.	4.05	0.68
4.	Students must be taught how to participate in problem solving teaching.	3.98	0.78
5.	The problem solving framework contains many variations in approach that teachers may use.	3.90	0.84
6.	It is easy to identify agricultural problems on which to base instruction.	3.83	0.99
7.	Problem solving teaching can be effectively used with any age group (8th-12th).	3.73	0.96
8.	Problem solving teaching increases student retention and transfer of learning when compared to other approaches.	3.64	0.87
9.	Problem solving instruction must be based upon real or potential problems experienced by students working in agriculture.	3.64	0.96
10.	Problem solving as an approach to teaching is not too difficult for my students to effectively participate as learners.	3.63	1.10
11.	Problem solving as an approach to teaching works well with topics in agribusiness, horticulture, and other non-production areas.	3.54	0.99
12.	Problem solving as an approach to teaching can be used effectively even though students do not have satisfactory SOE program.	3.47	1.21
13.	My students seem to learn more and enjoy more when I use problem solving.	3.38	0.89
14.	Teachers should use problem solving teaching for most of their instruction.	3.27	0.85

15.	I enjoy teaching best when I use a problem solving approach.	3.24	1.06
16.	Students often get interested when I use problem solving teaching.	3.17	0.88
17.	Many topics taught in secondary agricultural programs are well suited to problem solving teaching.	3.07	1.06
18.	Problem solving teaching is more effective than a subject matter approach in promoting changed behavior.	2.85	1.01
19.	Several years of experience are not needed to develop expertise in using problem solving teaching.	2.74	1.07
20.	Planning and teaching with problem solving require less time than other approaches.	2.47	1.06

1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

TEACHERS' KNOWLEDGE AND ATTITUDES TOWARD PROBLEM-SOLVING TEACHING
A CRITIQUE

Lloyd H. Blanton, Clemson University

Overview. In this descriptive correlational study of 25% sample of Illinois' teachers of agriculture (production and agbusiness), the authors targeted problem-solving teaching (PST): (1) knowledge of teacher about PST, (2) attitudes of teachers about PST, and (3) correlation of teachers' knowledge and attitudes with demographic variables.

Strengths

Importance of topic. The profession can benefit from the emphasis PST gains from the authors' efforts and sensitivity to the topic and its importance. The authors' report is important in that it reported: "use of PST" and "attitude about PST" are unrelated to teachers' scores on "knowledge about PST," and "use of PST" and "attitude about PST" are positively related to "use of PST" and "emphasis upon PST" during the student-teaching experience.

Description of procedures. Description of procedures was concise (almost parsimonious) and generally clear. This section demonstrated the authors' sensitivity to sample size and selection plus instrument testing and reliability and content validity, including KR_{20} index of homogeneity and reference to use of a faculty to establish content validity. Useable return rate of 74% was reported with reference to comparisons of early and late responses.

Writing of results section. Writing style is concise and generally clear.

Suggestions for Improvements

Results section. While inclusion of Table 1 and Table 2 give details and significant insight into the construction and content of the instruments, this inclusion used limited space that could have been better devoted to including other tables, such as ANOVA and simplified frequency tables of responses. That is, conservation of limited space for results may be improved with improved decisions of the scope and type of tables to be reported in an abbreviated form of report.

Purpose and objectives. Even in descriptive studies *without* hypotheses such as this one, research objectives should embrace the scientific process and thereby raise quality of our research: (1) identification of *relationships* of dependent and independent variables and (2) implications for *quantification* and *testing* of those relationships. Objective one and objective two of this study are not research objectives; conversely, they function as procedural objectives. For example, objective three meets the criteria and provide an entre' to scientific comparisons; objective one could be rewritten: "Are knowledge levels about PST of Illinois secondary agriculture teachers similar across groups formed by selected independent variables?" As such, it would imply a test of significance and address the dependent and independent variables of interest. A cleaner description of all variables and how they were quantified (to establish data level) would be useful for commenting on the statistical tests chosen.

Conclusions and recommendations. In view of several low "r-values" (even though statistically significant), one senses a major omission from recommendations: recommend studies that help to explain unknown factors which could explain more of the coefficient of determination. For example, when $r = .25$, $r = .42$, and $r = .40$ (as reported), what are suspected variables which may explain more? And, one might expect that another literature review may lead to a multiple regression study to identify, by stepwise procedures, those variables which would maximize prediction of the dependent variable(s).

FACTORS INFLUENCING THE USE OF VOLUNTEERS BY MICHIGAN SECONDARY AGRICULTURAL EDUCATION TEACHERS

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INTRODUCTION

Agricultural education programs at the secondary level in the United States are in transition. There has been a significant decline in student enrollment in agricultural educational classes (Rossetti, et al., 1989; Connors, et al., 1989). In a national study conducted by Communicating for Agriculture, FFA State Advisors and Executive Secretaries reported that student enrollment in secondary agricultural education had decreased significantly. According to the study, 80% of the respondents reported a decrease in enrollment, 11% reported no significant change in enrollment, while none reported an increase in enrollment.

Enrollment in secondary agricultural education programs in Michigan has also declined as much as 40% from the time of the highest enrollment figures (Warmbrod, 1987). In recent years, more agricultural education programs in Michigan public schools were dropped than added. If secondary agricultural education programs are to maintain program vitality, it will require a steady supply of qualified students.

Several factors contribute to the steady supply of qualified students in a secondary agricultural education program. Bobbitt (1988) analyzed the opinions of secondary school principals of schools that have either dropped, added or maintained agricultural programs. He found that both student and parent interest were high in schools where programs had been regularly maintained and that schools with active advisory committees not only maintained, but further developed their agricultural education programs. Involvement of local citizens within various facets of the program influenced program vitality.

One of the conventional approaches to citizen involvement in public educational programs is the utilization of community volunteers. Volunteer activities have become an expected facet within the public school system (Decker, 1988; Sandfort, 1987). They have proven to serve as an important community resource. Mobilization of volunteers has been a major determinant of successful programs in Cooperative Extension Service (Steel, et al., 1985, Linnemann, et al., 1988). A growing body of literature suggests that increased involvement of volunteers results in increased positive perception about the specific volunteer activity and the associated school system (Donahue, 1988; Cassidy, 1986; Wakefield, 1984).

Because volunteers' active participation in advisory committees has contributed in maintaining and further developing local agricultural education programs, one needs to explore the possibility of utilizing more of this local resource to maintain program vitality. Studies indicate that many secondary agricultural education teachers in Michigan are currently utilizing volunteers in different facets of their program (Bobbitt, 1988; Wamhoff and Suvedi, 1988). However, not all teachers tend to make use of volunteers, and the extent to which volunteers are utilized in different aspects of agricultural education programming tends to vary among teachers. Currently, no study has identified factors that influence the decisions of secondary agricultural education teachers to utilize volunteers in their agricultural education programs.

PURPOSE AND OBJECTIVES

The purpose of this study was to identify the factors influencing the use of volunteers by Michigan secondary agricultural education teachers. More specifically, the objectives of this study were to:

1. Determine whether and to what extent secondary agricultural education teachers utilize volunteers in different aspects of their programs.

2. Determine if teachers' perceptions about volunteers and perceptions about the extent of help that they provide to different aspects of agricultural education programs influence teachers' decisions to use them.

3. Determine if demographic characteristics of the agricultural education teachers (such as age, sex, education, position, experience, and self-assessment of effectiveness of their agricultural education programs) are associated with their decisions to utilize volunteers.

4. Determine if the type of secondary school and the school community environment influence the secondary agricultural education teachers' decisions to utilize volunteers.

5 Determine if secondary agricultural education teachers' perceptions about volunteers, perceptions about the extent of help volunteers could provide to different aspects of their programs, and demographic characteristics are associated with the number of volunteers utilized in different aspects of agricultural education programs.

PROCEDURES

This study was developed as descriptive survey research. The population for this study was agricultural education teachers in the state of Michigan. A total of 142 teachers were identified from the current agricultural education teachers' mailing list.

The data collection instrument was a self-administered mailed questionnaire. For the purpose of this study, volunteer was defined as any person who assists the secondary agricultural education program through time, efforts, funds, or materials. The agricultural education teachers were requested to indicate whether they had utilized volunteers during the current school year (87% said yes). They were also asked to indicate the level of assistance volunteers offered in strengthening different aspects of their agricultural education programs. The extent of perceived helpfulness was measured on a six point scale, i.e., 0 = not helpful and 5 = very helpful. Similarly, perceptions about volunteers were assessed using a 5 point Likert-type scale. Teachers expressed the extent of agreement/disagreement (1 = strongly disagree and 5 = strongly agree) on 12 statements pertaining to the prospects of volunteer involvement in strengthening local agricultural education programs.

A panel of experts from the Department of Agricultural and Extension Education, Michigan State University and the Michigan Association of Teachers of Vocational Agriculture's (now the Michigan Association of Agriscience Educators) Board of Directors examined the questionnaire to ascertain its content validity. The questionnaire was field tested for reliability. Chronbach's α was 0.76 for questions pertaining to perceptions about volunteers and 0.88 for questions about the extent of help volunteers could provide to different aspects of their programs.

Questionnaires were mailed to all secondary agricultural education teachers in Michigan in April, 1988. A follow-up letter reminding the teachers to complete and return the questionnaire was sent two weeks after the first mailing. Sixty percent of the questionnaires were completed and returned to the researchers. A comparison among selected demographic variables indicated no difference between respondents and non-respondents.

ANALYSIS OF DATA

Data were analyzed using frequencies, means, standard deviations, correlation coefficients, chi-square statistic, t-tests, and analysis of variance (alpha = .05). All data were analyzed using the Statistical Package for the Social Sciences/Personal Computer Program (SPSS, Inc., 1988).

RESULTS

Objective 1: A majority (87.2%) of agricultural education teachers in Michigan were utilizing volunteers in their educational programs. Volunteers were mainly used on advisory boards and/or committees. Other major areas of volunteer use included field trips and conventions, classroom instruction, supervised agricultural experience (SAE), promoting programs, and leadership activities in FFA. The number of volunteers utilized by the teachers, however, varied greatly as indicated by large standard deviation values in Table 1.

Objective 2: Positive perceptions about volunteers and the extent of help that volunteers could provide tend to be associated with the decisions of agricultural education teachers to use volunteers. T-test results indicated that teachers who were utilizing volunteers had more positive perceptions about volunteers than those who were not currently utilizing volunteers (Table 2). Positive perceptions about volunteers were also found to be significantly associated with their decisions to use volunteers in FFA skill contests and program promotion activities.

Table 1

Volunteer Use by Michigan Secondary Agricultural Education Teachers

Program Aspects	% of teachers using volunteers	No. of volunteers Mean	SD
Advisory Board/Committee	97.1	12.6	12.5
Classroom Instruction	85.5	5.2	4.5
Laboratory Instruction	79.7	6.1	5.0
Field Trips and Conventions	94.4	5.7	5.1
Leadership Activities in FFA	83.6	8.1	9.4
FFA Skills Contests	69.0	4.1	4.4
SOEP	85.5	17.2	20.6
Guidance and Counseling	27.3	4.3	4.3
Assist with Office Operation	17.5	2.9	2.0
Promoting the Program	84.3	14.4	14.1
Recruitment	40.3	6.7	10.7
Evaluating the Program	72.1	7.9	3.5

Table 2

Teachers' Perceptions about Volunteers and their use of Volunteers

Agricultural Teachers	(n)	Mean perception score	t-value	2-tail probability
Use volunteers	72	3.75	4.49	0.00
Don't use volunteers	11	3.14		

Similar findings were noted in terms of teachers' perceptions of the extent of help volunteers could provide to local agricultural education programs. Findings indicated that positive perceptions about the extent of help that volunteers could provide were associated with the decisions of teachers to use volunteers. Teachers who make use of volunteers had significantly higher levels of positive perceptions than non-users (Table 3). Furthermore, positive perceptions about the extent of help that volunteers could provide were associated with teachers' decisions to use them in evaluating programs.

Table 3

Teachers' Perceptions about the Extent of help Volunteers provide and their use of Volunteers

Agricultural Teachers	(n)	Mean perception score	t-value	2-tail probability
Use volunteers	74	3.52	3.80	0.00
Don't use volunteers	11	2.62		

Objective 3: Of the 86 secondary agricultural education teachers responding to this study, a great majority (91.9%) indicated working in a comprehensive high school. Almost half (46.5%) had a master's, specialist's, or doctoral degree with a major in agricultural education. About two-thirds (71.8%) were under 45 years of age. Approximately one-tenth (11.6%) of the respondents were women. Their teaching experience ranged from 1 to 36 years with an average of 13.8 years and only about one-eighth (13%) indicated having a teaching certificate of annual or temporary vocational authorization in agriculture.

Analysis of demographic data as it relates to volunteer use by agricultural teachers indicated that younger and less experienced teachers when compared to older and more experienced teachers more frequently utilized volunteers in their programs. More teachers between 35-44 years of age used volunteers in recruitment than either younger or older teachers. Similarly, older teachers (i.e., 45 years and older) in comparison with younger ones used more volunteers in program evaluations. Female teachers when compared with their male colleagues did not use volunteers in recruitment and also used less volunteers in SAE programs. Few teachers indicated using volunteers to assist in their office operations. The decision to use volunteers to assist in office operations was associated with teachers' self-assessment of more effective programs.

Objective 4: No significant differences were found between type of school or rural-urban school community environment and agricultural education teachers' decisions to use volunteers. However, an association was observed between athletic size of the school and agricultural education teachers' decisions to use volunteers in laboratory instruction (X^2 = 9.96; df = 3), FFA leadership activities (X^2 = 8.38; df = 3), and FFA skills contests (X^2 = 18.44; df = 3). In each situation teachers in smaller sized schools tended to use less volunteers than teachers in larger schools.

Objective 5: Some relationships existed between the number of volunteers used in different aspects of agricultural education programs and agricultural education teachers' perceptions about volunteers (Table 4). Moderate and positive relationships (Davis, 1971) were noted between teachers' perceptions about volunteers and the number of volunteers utilized in classroom instruction (r = .4776), recruitment (r = .4153) and leadership activities in FFA (r = .3511). A negative substantial relationship (r = -.5796) was found between the perceptions about volunteers and the use of volunteers in assisting teachers with office operations.

Except for program promotion purposes (r = .3486), agricultural education teachers' perceptions about the extent that volunteers could assist local agricultural education programs had negligible or low associations with the number of volunteers utilized in agricultural education programs. Again, a negative relationship (r = -.2907) was noted between the perceptions about the extent of help volunteers could provide and the number of volunteers utilized in assisting with office operations.

Table 4

Relationship between Selected Characteristics and the Number of Volunteers Utilized in Different Aspects of the Program

Number of volunteers Used in different aspects	Perceptions about		Self-assessment of program effectiveness	Experience (in years)
	volunteers	extent of help volunteers provide		
Advisory Board/Committee	.1232	.1916	-.0078	.2123
Classroom Instruction	.4776*	.0778	-.1678	.2321
Laboratory Instruction	.1745	.0084	-.1588	.1100
Field Trips and Conventions	.2692	.1928	-.0567	.2435
Leadership Activities in FFA	.3511*	.0561	.1039	.0616
FFA Skills Contests	.0345	.0169	.2492	-.0295
SOEP	.1061	.1211	.1267	-.0851
Guidance and Counseling	.1766	.1069	.0735	-.4343*
Assist with Office Operation	-.5796**	-.2907	.0904	-.7833***
Promoting the Program	.2962	.3486*	.1768	-.1797
Recruitment	.4153*	.1503	-.2573	.1313
Evaluating the Program	.1582	.2015	-.0763	-.0117

* moderate association
** substantial association
*** very strong association

A very strong negative relationship (r = -.7833) was found between years of teaching experience and the number of volunteers utilized by teachers in assisting them in office operations, guidance and counseling. A moderate negative association (r = -.4343) was noted between years of teaching experience and utilizing volunteers in guidance and counseling. Only negligible and low associations were observed between the number of volunteers utilized in different aspects of programs and self-assessment of effectiveness of programs.

CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

Agricultural education teachers in Michigan are utilizing volunteers in their educational programs. Findings indicated that volunteers predominately served on advisory committees and assisted with field trips, SAE and leadership activities in FFA. Many teachers do not consider using volunteers to assist them in their office operations, guidance and counseling, and recruitment. Considering the need for program revitalization through a steady supply of students, it is time to explore all possible voluntary roles and involve volunteers to enhance strong community support for agricultural education programs.

Findings indicated that teachers' positive perceptions about volunteers and their perceptions about the extent of help that volunteers can provide were related to the extent of volunteer use in educational programs. In order to effectively utilize this local resource, agricultural education teachers need to realize that the involvement of local citizens including parents, FFA alumni, local leaders, leaders of local business, governmental agencies and farm organizations is instrumental. In-service programs for teachers, irrespective of their age, experience or gender, on strategies for utilizing volunteers to strengthen local agricultural education programs could enhance the development of positive perceptions about volunteers.

Specifically, more volunteers should be utilized in assisting with classroom instruction, laboratory instruction, field trips and conventions, FFA skills contest, guidance and counseling, and recruitment if revitalizing programs is a goal. Improving the quality of volunteer involvement should be emphasized and encouraged through appropriate channels, such as teacher conferences.

A structure of appropriate benefits and incentives would motivate agricultural education teachers to effectively utilize volunteers. The State Department of Education could adopt policies to stimulate and encourage teachers to work with volunteers.

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FACTORS INFLUENCING THE USE OF VOLUNTEERS BY MICHIGAN SECONDARY AGRICULTURAL EDUCATION TEACHERS

A Critique

Philip Buriak, University of Illinois -- Discussant

The introduction follows a logical progression: a) "If secondary agriculture programs are to maintain program vitality, it will require a steady supply of qualified students." b) "Involvement of local citizens within programs influences program vitality." c) "Increased involvement of volunteers results in increased positive perception about the volunteer activity and the associated school system." The reader is left to assume that increased volunteer use will increase positive perceptions, thus leading to an increase in the supply of qualified students. No theory was presented to support this assumption.

The closing statement of the introduction stated "Currently no study has identified factors that influence decisions of secondary agricultural education teachers to utilize volunteers." Although this may be correct when limited exclusively to secondary agricultural education programs, much theory and research does address factors associated with decision making and utilization of volunteers, and may be generalizable to agricultural education. This investigation lacks a theoretical base. A review of the reference list will support this statement.

The stated purpose was to identify factors influencing the use of volunteers by Michigan secondary agricultural education teachers: Objective 1 (Extent of utilization of volunteers): 87% of Michigan teachers used volunteers. This supports findings by Bobbitt, 1988: Wamhoff and Suvedi, 1988. This information was already known. Increasing use of volunteers from 87% to 100% will probably do little to change perceptions, increase program vitality, and increase student numbers. Objective 2 (Do teachers perceptions about volunteers influence their decision to use them): Of course they do. A review of decision making theory would substantiate this. Objective 3 (Are demographics associated with decision to use volunteers): Yes. Again substantiated by theory. Objectives 4 and 5 dealt with school/community environment and association of demographics with perceptions regarding volunteer use. They do provide the reader with some new information, but add little regarding factors influencing decisions to use volunteers.

Procedurally the study was sound. All of the correct methods and safeguards to validity were used appropriately...with one exception. Questionnaires were mailed to all secondary agriculture teachers. Why use inferential statistics?

The principle conclusion stated, "teachers' positive perceptions about volunteers and the extent of help volunteers can provide were related to volunteer use". Was this study needed to arrive at this conclusion? The researchers are knowledgeable in the application of research design and statistics, but need to expand their review of research, literature, and theory beyond our own journals and popular press publications, delving deeper into theory guiding such topics as decision making and volunteers.

INTERNATIONAL PROGRAMMING DELIVERED BY COUNTY 4-H PROFESSIONALS

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INTRODUCTION

Leaders in education, business and industry have described a need for internationally competent citizens. While some individuals question the need for international education and doubt its relevance, the fact that the world is becoming more interdependent has been extensively documented.

Understanding other cultures and knowledge of the world have become imperatives because of the increasingly interdependent nature of the world. According to statistics reported by the Commission on International Education of the American Council of Education (1984), the jobs of one in six U.S. production workers are directly dependent on international trade. Furthermore, 20% of U.S. industrial output is for export, 40% of the U.S. farmland produces for export, and about one third of U.S. corporate profits are generated by international activities. Preparing people to live in a global society has become a necessary component of citizenship education (Rosenau, 1983).

Boaz (1986) reaffirmed that in today's world, progress and problems are not limited to districts, states, or nations. She believed that they extend around the world requiring education and information which will help a society cope with global problems and crises. MacCormack (1984) stressed the dangers of diminishing competencies in languages and international studies at a time when issues of war and peace, population and ecological balance, and employment and job generation have become more international in causes and solutions.

Four-H has the capacity to play a vital role in developing internationally competent citizens. The mission of Penn State 4-H and Youth Development is "to help youth become self-directed, productive, and contributing members of society through experiential nonformal education programs conducted by professionals and volunteer staff who apply the research and educational base of the Land-Grant University System to youth and adult development" (Penn State University, 1989, p. 8). In a related impact study of 4-H in Pennsylvania, Cantrell, Heinsohn and Doebler (1988), revealed that life skill development dramatically increased when teens experienced leadership roles beyond the club level.

Specifically contributing to the mission of 4-H, international programs foster understanding between different cultures and peoples and nurture the development of life skills by providing leadership and citizenship experiences beyond the club and state level. William Kline of Allis-Chalmers, an early International Four-H Youth Exchange supporter, stated, "As the world gets smaller, the people of the world must get bigger; bigger in their thinking, bigger in their outlook, bigger in their understanding of one another" (cited in Wessel & Wessel, 1982, p. 161).

PURPOSES AND OBJECTIVES OF THE STUDY

Four-H international programs delivered by county 4-H professionals provide clientele an opportunity for international education through exchange programs as well as other international educational opportunities. The primary purpose of this study was to investigate county based 4-H professionals' involvement in 4-H international programs in Pennsylvania. Four-H professionals' involvement was measured by county clientele participation in 4-H international programs. In addition, professionals' attitudes and perceived impediments regarding 4-H international programs were determined. A secondary purpose was to identify and describe demographic characteristics that influence county 4-H professionals' attitudes about international programs.

The study had the following objectives:

1. Identify clientele participation in 4-H international programs.
2. Determine attitudes of county 4-H professionals regarding 4-H international programs.
3. Determine perceptions of county 4-H professionals regarding impediments to delivering 4-H international programs to clientele.
4. Describe relationships between selected demographic characteristics of county 4-H professionals and their attitudes regarding 4-H international programs.

PROCEDURES

The researcher developed a questionnaire to elicit data from 4-H professionals about (l) clientele participation in 4-H international programs in the county where they work, (2) their attitude toward 4-H international programs, (3) barriers to delivering 4-H international programs, and (4) demographic data including age, number of years employed by cooperative extension, highest educational degree, whether or not they had an international dimension in their formal education, international travel experience, characteristics of where they currently live, and the number of places they have lived in the past. A panel of experts at the Pennsylvania State University who were interested in international education judged the questionnaire to have acceptable face and content validity. Pilot testing (with Nebraska 4-H professionals) of the attitude scale yielded a Cronbach's alpha reliability coefficient of .83.

The population consisted of all Pennsylvania extension agents and program assistants who had 4-H programming responsibilities. One hundred and twelve professionals returned completed questionnaires for an 85% response rate. Early and late respondents were compared. No significant differences were found in age, number of years employed by cooperative extension, educational level, whether or not they had an international dimension in their formal education, international travel experience and the number of other communities in which they had lived.

ANALYSIS OF DATA

The data were analyzed according to the objectives of the study using the statistical Package for Social Sciences (SPSS-X, 3.1). Descriptive statistics were used to report and describe the data. The point-biserial correlation and phi coefficients were used to describe intercorrelations among selected demographic characteristics and attitudes of 4-H professionals toward international programs (objective 4).

RESULTS

The results are reported as they relate to the objectives. The number with each subheading below corresponds to the number of the objective.

1. CLIENTELE PARTICIPATION

Half (50%) of the 4-H professionals reported that clientele in their county participated in 4-H international programs. Hosting international visitors was reported most frequently as the type of program in which clientele participated. Regarding other educational opportunities available without international travel, less than 15% of the professionals reported clientele participation in international projects and studies at the county level, Citizenship World Focus or state 4-H international camp. Of the professionals who reported clientele participation in exchange programs, Ambassador to Japan was reported most frequently (14%), followed by International 4-H Youth Exchange Representative (11%), and Ambassadors to countries other than Japan (8%).

A comparison of frequencies between 4-H professionals who indicated clientele participation in international programs and professionals who reported no clientele participation revealed a discrepancy with methods used to communicate opportunities in those programs. Both groups reported using the extension/4-H newsletter most frequently as a way to inform clientele about opportunities in international programs. However, 4-H professionals whose clientele participated in international programs used personal contacts and meeting announcements more often.

2. ATTITUDES REGARDING 4-H INTERNATIONAL PROGRAMS

Four-H professionals responded to a series of attitudinal items about 4-H international programs. The mean of the 20 attitudinal items for all respondents ($\underline{n}$=108) was 3.62 on a 5 point scale, signifying that 4-H professionals were positive about 4-H international programs. Professionals "agreed" that there is a place for international programs in 4-H. Furthermore, they indicated that these programs are beneficial as participants gain cultural understanding and develop life skills. On a larger scale, professionals "agreed" that these programs promote international understanding and are an important part of the educational program in 4-H.

According to Shaw and Wright (1967), an individual's attitude(s) about a particular object predispose that individual to behave in a particular way toward that object. Thus, a point-biserial correlation coefficient statistic was used to determine the strength of the relationship between 4-H professionals' involvement in international programs and their attitudes regarding those programs. The data indicate a low relationship (rpbi=.20). Four-H professionals who were involved in those programs were more positive about international programs than were 4-H professionals who were not involved in 4-H international programs.

3. IMPEDIMENTS TO 4-H INTERNATIONAL PROGRAMS

Professionals' perceptions of impediments regarding 4-H international programs were solicited through an open-ended question. The responses were categorized and tabulated into one of two groups: impediments to clientele participation and/or impediments to the professionals' involvement in international programs. Professionals believed that a lack of money caused difficulties for many of their clientele with participation in 4-H international programs. A lack of state leadership and a lack of time were most frequently listed as barriers to 4-H professionals' involvement in international programs.

4. DEMOGRAPHIC CHARACTERISTICS AND ATTITUDES REGARDING 4-H INTERNATIONAL PROGRAMS

Four-H professionals' international experience, the presence of a college/university in the community in which they live, the population of the community, and the amount of ethnic diversity in the community of residence have low relationships with the 4-H professionals' attitude about 4-H international programs. Although coefficients indicate that these four demographic characteristics are related to attitude about international programs, the relationships are weak.

Four-H professionals' international experience was positively related to their attitude about international programs (rpbi=.26). There is a negative relationship (rpbi=.17) between the size of the community where the professionals live and their attitude about 4-H international programs. The relationship between the presence of a college/university where the 4-H professionals live and their attitudes was also negative (rpbi=.29). In addition, the amount of ethnic diversity in the community where the 4-H professionals live has a low relationship (phi=.12) with the professionals' attitude regarding 4-H international programs. In summary, 4-H professionals who have international experience are more positive about 4-H international programs while 4-H professionals who live in larger communities, have more ethnic diversity, and have a college/university located in the community of residence were less positive about international programs.

CONCLUSIONS

The need for international education has been reiterated by leaders in education, business and industry. Four-H international programs delivered by county professionals have the capacity to play a role in developing internationally competent citizens through exchange programs as well as other international educational opportunities.

County 4-H professionals are responsible for a diverse range of project areas and each project area demands knowledge, skill, and time. Thus, professionals tend to promote and deliver the program areas in which they are interested, know the most about, and in which they are most skilled. The fact that professionals who are not involved in international programs used personal contacts less often supports the notion that time is a factor in their decision to be involved in international programs since personal contacts are more time consuming. Furthermore, international programs which do not require international travel are underutilized, especially since cost was frequently reported as a major barrier (objective 3) to clientele participation in international programs.

Four-H professionals who are involved in 4-H international programs tend to have a more positive attitude about international programs than professionals who are not involved in such programs. This indicates that the 4-H professionals' attitudes about international programs may predispose their involvement in 4-H international programs. An alternative conclusion is that once professionals become involved in international programs and believe the programs are beneficial, their attitude may become more positive.

Four-H professionals view the quality of state leadership and time constraints as impediments to 4-H international programs. Clear, consistent communication from the state level to county staff about international program opportunities should decrease 4-H professionals' negative feelings regarding leadership. Inservice programs about the variety of international programs and ideas on how to implement them may provide more guidance for 4-H professionals. In addition, careful recruitment and training of volunteers for international programs may alleviate some of the time demands requested of 4-H professionals.

While the strength of the relationship is low, 4-H professionals who have international experience are more positive about international programs. This finding supports previous research which indicates that individuals' personal exposure to an international experience positively influences their attitude about international education. Many of the international programs available to clientele also provide opportunities for 4-H professionals as group leaders. Therefore, professionals should be encouraged to participate.

Although findings regarding the characteristics of 4-H professionals' type of residence and their attitude toward international programs were unexpected, at least two alternative conclusions can be drawn. First, traditional clientele (families in rural areas) have historically been involved in 4-H international programs. As a result, 4-H professionals in rural areas have had more personal involvement in 4-H international programs as opposed to 4-H professionals who work with nontraditional clientele in urban areas. This suggests the importance of emphasizing the benefits of 4-H international programs to nontraditional clientele. Second, professionals who live in urban areas that have a moderate or substantial amount of ethnic diversity may encounter more negative attitudes toward ethnic groups. This may be true especially if there are large ethnic communities within the larger community and misunderstanding of ethnic traditions and competition for jobs occur. In this case, international education may help develop understanding of other cultural traditions as well as one's own traditions and therefore reduce prejudices.

RECOMMENDATIONS

The following recommendations were made based on the findings of this study. County 4-H professionals should (l) promote international educational programs which do not require international travel and (2) recruit volunteers who are interested in assisting with or taking responsibility for 4-H international programs. State 4-H faculty should (l) implement clear and consistent communication to establish leadership and direction for the international programs, (2) promote and encourage international opportunities for 4-H professionals in international programs, and (3) encourage 4-H professionals who work with nontraditional clientele to become involved in international programs.

In addition, further research should be conducted to (l) identify and describe volunteer participation in 4-H international programs, (2) determine clientele benefits of international programs which do not require international travel, (3) identify additional factors which contribute to 4-H professionals' involvement in international programs and describe factors which encourage professionals to become involved in international programs, and (4) identify international opportunities for 4-H professionals to increase their experience with international programs. Further research should also determine why there was a weak negative relationship when comparing 4-H professionals' attitudes toward international programs, with (1) the size of the community where those professionals live, (2) the amount of ethnic diversity in the community, and (3) the presence of a college or university in the community.

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INTERNATIONAL PROGRAMS DELIVERED BY COUNTY 4-H PROFESSIONALS

A Critique

Philip Buriak, University of Illinois -- Discussant

Preparing students for life in a global society is not an unworthy endeavor. Using 4-H programs to "foster understanding between different cultures and peoples and nurture the development of life skills..." is a good idea. The purpose of this study was to investigate county-based 4-H professionals involvement in 4-H international programs in Pennsylvania.

The standard formula was followed: Who participates? What are their attitudes and perceptions? How do their attitudes correlate with demographics?

The researchers correctly used the appropriate methodology to identify participants, determine attitudes and perceptions of the participants about international programs, and describe relationships between attitudes and perceptions and demographics. Minor procedural points are noted: Experts for the determination of validity were described as those interested in international education. Does interest qualify one as an expert? Pilot testing of the attitudinal scale was done in Nebraska. Are Nebraska 4-H professionals the same as Pennsylvania 4-H professionals?

Findings support conclusions and may be beneficial to programs in Pennsylvania. The recommendations forwarded might just have easily been made without the substantiation of this investigation.

The researchers have conducted an investigation that was done well for what its intended use might have been.

THE SUBJECT AREAS AND CONCEPTS OF AGRICULTURAL LITERACY

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INTRODUCTION

Since the release of the National Academy of Science (NAS) entitled, Understanding Agriculture- New Directions for Education (1988), the profession has focused much attention on its findings. The publication recommended that agricultural education go beyond the scope and content of traditional programs. The Committee on Agricultural Education in Secondary Schools felt that "agriculture was too important a topic to be taught to only a relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies" (1988, p. v). Subsequently, the committee developed the idea of "agricultural literacy" - the goal of education about agriculture.

The NAS Committee (1988) recommended that the subject matter of instruction in and about agriculture must be broadened and that Colleges of Agriculture, particularly in land-grant universities, become more involved in curriculum reform and the development of instructional materials and media. Thompson (1986, p.1) stated, "If even well-informed citizens remain ignorant of basic facts about food, agriculture and natural resource systems, the activities of agricultural colleges will increasingly be perceived as serving only the interests of a narrow (and dwindling) constituency." To facilitate curriculum reform, and the development of instructional materials and media, the subject areas and concepts constituting an agricultural literacy curriculum need to be determined.

PURPOSE AND OBJECTIVES

The fundamental purpose of this study was to develop a document that could provide educators with the concepts about agriculture that every citizen should know. The specific objectives of this study were

1. to identify those subject areas falling within the framework of agricultural literacy, and

2. identify those agricultural concepts that every citizen should know.

Subject areas refers to educational disciplines that are either related to or are part of agriculture. Concepts describes a general idea or notion about agriculture.

PROCEDURES

The main method of inquiry for this study was the Delphi technique. According to Helmer (1966), variants of the Delphi can be applied to all phases of educational planning, including curriculum reform.

INSTRUMENT DEVELOPMENT

Two questionnaires were developed and employed. The design of the first was based on the recommendation by the NAS Committee (1988, p. 6) that the subject matter of instruction about agriculture be broadened. Questionnaire #1 asked panelists to identify agricultural subject areas. The design of questionnaire # 2 was based on the 11 subject areas identified through questionnaire #1. The subject areas identified were returned to panelists for their reaction and for consensus development .

The subject areas of agricultural literacy identified through the first questionnaire were incorporated in the second questionnaire sent to the panelists. These areas were 1) agriculture's important relationship with the environment, 2) processing of agricultural products, 3) public agricultural policies, 4) agriculture's important relationship with natural resources, 5) production of animal products, 6) societal significance of agriculture, 7) production of plant products, 8) economic impact of agriculture, 9) marketing of agricultural products, 10) distribution of agricultural products, and 11) global significance of agriculture. This questionnaire asked each panelist to react to the subject areas by submitting one concept for each of the 11 agricultural subject areas identified. Each concept submitted was compiled under its broad subject area, and duplicate concepts were eliminated.

SELECTION OF DELPHI PANELISTS

After reviewing the literature and related research, a letter requesting a minimum of three nominees to the Delphi panel was sent to faculty members at land-grant university agricultural education departments. The letter asked that nominees possess an interest in agricultural literacy; have the time, in the nominator's estimation, to devote to the study; and not be faculty members of any agricultural education department. The total number of individuals nominated by 48 agricultural education faculty members was 147. Of these, 100 initially agreed to participate in the study. From the initial 100 panelists, 2 asked to be removed from the panel because of other commitments, 78 submitted subject areas, and 58 submitted concepts. Panelists from 41 states submitted subject areas and panelists from 36 states participated in identifying concepts for each of the 11 subject areas.

COLLECTION OF DATA

Two questionnaires were used to identify the subject areas making up the framework of agricultural literacy and to generate the concepts for those areas. Questionnaires were printed and mailed with an appropriate cover letter to each panelist. Response rates for the questionnaires were 78% for the first and 55% for the second.

Five hundred and ninety concepts were generated from the second questionnaire. Some panelists elected not to generate concepts in some of the 11 broad subject areas because they felt that they were not knowledgeable in those areas. The great number of concepts made further refinement and consensus of concepts by the panelists difficult. The researchers felt that the great number of concepts to be reviewed by panelists would inhibit participation in subsequent rounds. Thus, the researchers eliminated duplicate concepts and further refined the list of concepts submitted.

ANALYSIS OF DATA

The treatment of data involved the use of quantitative content analysis. According to Lindkvist (1981), content analysis is principally a technique for quantitative analysis of extensive texts within the framework of a communication model. In this study, quantitative analysis consisted of frequencies and percentages.

The statistical analysis of Questionnaire #1 involved the calculation and reporting of frequencies and percentages of recurring text found in the 78 questionnaires submitted. Subject area text found in more than 25% of all questionnaires submitted was retained for use in Questionnaire #2. The subject areas identified were returned to panelists for their reaction. Because none of the panelists made any comments regarding the subject areas, consensus was reached.

A statistical analysis of Questionnaire #2 was not conducted. Concepts submitted in each of the 11 categories were subdivided, and duplicates were deleted to refine the concepts.

RESULTS AND CONCLUSIONS

AGRICULTURAL LITERACY SUBJECT AREAS

Data in Table 1 present the frequencies and percentages of recurring text found in 78 completed questionnaires submitted by panelists. From Table 1, the subject areas of agricultural literacy were developed. The analysis led to the observation of 11 broad agricultural subject areas and 2 behavioral texts found in over 25% of the 78 submitted questionnaires. The criterion of 25% text-recurrence was set by the researchers. The subject areas retained were reviewed by panelists. Consensus was reached because no suggestion was submitted by panelists to alter the subject areas identified. The 11 broad agricultural subject areas identified in the consensus definition were the topics of the second questionnaire.

AGRICULTURAL LITERACY CONCEPTS

Concepts were generated by panelists for each of the 11 agricultural literacy subject areas identified. A total of 590 concepts were submitted by 58 panelists (Table 2). The lists of concepts were refined by deleting duplicate concepts and combining related concepts, thereby reducing the number of concepts to 394 (Table 2). Some concepts remained in more than one subject area because they were relevant to a number of subject areas. The volume of concepts submitted prohibited reporting them in full in this paper. Examples of concepts submitted by panelists were 1) value-added processes increase net income at all levels of the production, processing, and marketing chain (subject area: the processing of agricultural products) and 2) social programs involve agriculture and have an impact on consumers, producers, and tax payers (subject area: societal significance of agriculture).

Fifty-two sub areas of the 11 agricultural literacy concept areas emerged from the list of panelists' concepts. Concepts were grouped into a sub-area when the concepts' content focused on a topic related to the broader subject area. The 11 agricultural literacy subject areas and their respective sub-areas are presented in Table 3.

TABLE 1. Quantitative content analysis results from questionnaire # 1 (N-78)

Behavioral Area Text	Frequencies	Percentages
An Understanding of agriculture	42	53.85
Knowledge of agriculture	34	43.59
Appreciation of agriculture	13	16.67
Awareness of agriculture	7	8.97
Educated about agriculture	4	5.13
Educated in agriculture	2	2.56
Ability to interpret	2	2.56

Conceptual **Area Text**	Frequencies	Percentages
Societal significance of agriculture	47 **	60.26
Production of plant and animal products *	46 **	58.97
Food and fiber system	40	51.28
Economic impact of agriculture	35 **	44.87
Natural resources and the environment *	34 **	43.59
Marketing	29 **	37.18
Processing	28 **	35.90
Public ag policies	22 **	28.20
Global significance	21 **	26.92
Distribution	20 **	25.64
Communication skills	15	19.23
The science of agriculture	15	19.23
The history of agriculture	11	14.10
Nutrition and Health	11	14.10
Biology	11	14.10
Agricultural Management	10	12.82
Careers and Occupations	10	12.82
Soil/land use	9	11.54
Technology	9	11.54
Outdoor environments	7	8.97
Food supply	6	7.69
Chemical use	5	6.41
Sustainable agriculture	5	6.41
Horticulture	5	6.41
Research of agriculture	5	6.41
Water/groundwater use	5	6.41
Retailing	5	6.41
Financing	5	6.41
Mechanics/engineering	4	5.13
Animal physiology	3	3.85
Farming	3	3.85
Forestry	3	3.85
Pleasure animals	3	3.85
Art of farming	3	3.85
Aesthetics of agriculture	3	3.85
Standard of living	3	3.85
Marine animals	2	2.56
Rural development	2	2.56
Risks of farming	2	2.56
Biotechnologies	2	2.56
Conservation Practices	2	2.56

** Retained as subject areas and used in Questionnaire #2
* Divided into separate subject areas in Questionnaire #2

Table 2. The 11 agricultural literacy subject areas by the total number of generated and refined number of concepts

Subject area	Number of concepts generated	Refined number of concepts
Agriculture's important relationship with the environment	55	39
The processing of agricultural products	51	31
Public agricultural policies	53	41
Agriculture's Important Relationship with natural resources	56	34
Production of animal products	52	29
Societal significance of agriculture	55	35
Production of plant products	55	37
Economic impact of agriculture	56	34
The marketing of agricultural products	53	43
The distribution of agricultural products	49	35
The global significance of agriculture	55	36
Total	590	394

Table 3. Eleven agricultural literacy subject areas and their respective subareas

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Agriculture's important relationship with the environment

- The agriculturalist's role in protecting the environment
- The effect of agriculture on the environment
- Opinions and perceptions
- Chemicals
- Positive effects of agriculture on the environment
- Negative effects of agriculture on the environment
- The environment's close relationship with agriculture
- Sustainable agriculture

The processing of agricultural products

- Steps and complexities of processing
- Importance of processing and value added products
- Food safety
- Product development and technology

Public agricultural policies

- Government policy impact on the industry
- The unaware public/consumer
- The government's role and limitations regarding agricultural policy

Agriculture's important relationship with natural resources

- Conservation of natural resources
- Sustainable agriculture
- Stewardship of agriculture
- Pollution and depletion of our natural resources
- Codependency between agriculture and natural resources
- Importance for agriculture

Production of animal products

- Consumer concerns
- The uses and roles of various animal species
- Biotechnology and genetics
- Animal husbandry

Societal significance of agriculture

- Society's lack of awareness
- Agriculture's effect on society
- Rural life
- Social benefits
- Food efficiency

Table 3. Eleven agricultural literacy subject areas and their respective subareas (Continued)

Production of plant products

- Greenhouse/gardens
- Use and care of plants
- Agronomic practices
- Biotechnology, biology, and genetics
- Profit
- Society

Economic impact of agriculture

- Macroeconomics/microeconomics
- Farm management
- Economic benefits and food costs

The marketing of agricultural products

- Marketing plan and strategy
- Global marketing
- Agriculture's function in a market-oriented economy
- Public perception

The Distribution of agricultural products

- The distribution system and its importance
- Global distribution and hunger
- Cost of distribution
- Efficiency of distribution
- Distribution sector employment

The global significance of agriculture

- Global food economics
- Global hunger and food distribution
- Technology and university research
- Global politics/sociology

CONCLUSIONS

The following conclusions were drawn based on the findings of this study:

1. Agricultural literacy encompassed 11 broad agricultural subject areas.
2. The 52 subareas identified provide further structure for curriculum development. The subareas can be used to develop modules about specific agricultural topics that can be integrated into the K-12 curriculum.
3. The 394 concepts remaining after refinement demonstrate the vast amount of knowledge and skill that agriculture applies to produce food and fiber.

RECOMMENDATIONS

The following recommendations were derived from the conclusions:

1. The concept lists should be refined by subject matter specialists and educators interested in incorporating aspects of agriculture into their current curriculum.
2. Subject matter specialists should identify where the concepts can be integrated into the existing curriculum.
3. Instructional materials developed should represent the breadth and scope of the agricultural discipline found in the concepts submitted.
4. A document should be developed that illustrates various teaching strategies that can be used to infuse agricultural literacy concepts in a systematic and comprehensive manner throughout the K-12 curriculum.
5. The 11 broad agricultural subject areas and their concepts should be useful to secondary agricultural education programs attempting curriculum reform.

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SUBJECT AREAS AND CONCEPTS OF AGRICULTURAL LITERACY

A Critique

Philip Buriak, University of Illinois -- Discussant

Well Done. The researchers are to be commended for attacking an important topic, a difficult topic, and a topic that must be addressed prior to all others regarding curriculum development and redesign to satisfy education about agriculture.

Delphi was the appropriate research methodology and appears to have been correctly utilized. The strength of the Delphi method is in the selection of the participants. Identification of experts is critical. More information about the participants may add to the manuscript.

Why were panelists limited to submitting one concept per subject area in question #2? Some excellent ideas may have been missed to facilitate management of large amounts of textual information.

Did the panelists have an opportunity to react to the final document? Iterations with controlled feedback may have further refined the listing. What feedback did the panelists receive?

The researchers addressed a topic of meaning to all of agricultural education.

NOTE: The American Association for the Advancement of the Sciences has completed Phase I of a multi-year national effort to determine what comprises scientific literacy for all. The project is titled Project 2061. The researchers may chose to review this report prior to continuing efforts directed to agricultural literacy for all.

ASSISTANCE NEEDED FOR ELEMENTARY TEACHERS IN TEXAS TO IMPLEMENT PROGRAMS OF AGRICULTURAL LITERACY

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INTRODUCTION

Since the publication of Understanding Agriculture: New Directions for Education by the National Research Council, new emphasis has been placed upon the teaching of agriculture to elementary school children. In its report, the Committee on Agricultural Education in Secondary Schools stated, "Agriculture is too important a topic to be taught only to a relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies" (National Research Council, 1988, p. 1).

Currently, only 4.5% of the high school students in the United States enroll in agriculture classes. The committee recommended that agricultural education programs expand to reach a greater number of students. One of the major conclusions of the National Research Council study was that, "Beginning in kindergarten and continuing through twelfth grade, all students should receive some systematic instruction about agriculture" (p. 2).

The emphasis placed on education about agriculture for children of all ages as recommended by the committee is not original. Philosophers such as Socrates, Pestalozzi, and Comenius all believed that, early in life, people should learn about plants, animals, and the ways humans use them (Snowden & Shoemake, 1973). Human development theories formulated by Freud, Erikson, and Piaget suggest that between the ages of six years and eleven years children develop opinions and ideas that last throughout their life. They also believed that this same approximate age range is appropriate for children to learn about their environment and society (Davis, 1983). Thus, it would be appropriate to introduce agriculture, with its many applications and concrete examples, to children in the upper grades of elementary school.

Many materials designed to teach children about agriculture have been developed by a variety of groups. Several governmental agencies, agricultural businesses, agricultural organizations, and environmental groups have developed materials covering a vast array of subjects related to agriculture. In spite of this variety of materials and sources, a common thread does exist; it is generally agreed that the best way to deliver programs of agricultural literacy is by integrating agricultural topics into the curriculum of established disciplines (Everett, 1985; McReynolds, 1985; National Research Council, 1988). Thus, the role of the elementary school teacher has become very important.

Drake (1990) pointed out that the success of any program intended to teach children about agriculture depends upon the ability of the teacher. Considering the fact that Swan and Donaldson (1970), as well as Bowers and Kohl (1986), found that elementary school teachers rate their knowledge of agriculture as low, the need for some type of program to help teachers teach about agriculture is apparent.

Oliver (1986) concluded that elementary teachers would not be able to apply agricultural concepts in their teaching effectively without training or assistance of some kind. However, little was known about the focus of such programs or the type of program format preferred by teachers.

PURPOSES AND OBJECTIVES

The purposes of this study were to assess fourth grade teachers' understanding and use of agricultural concepts in their teaching and to determine if assistance is needed to help teachers implement programs of agricultural literacy in the classes they teach. The objectives developed to accomplish these purposes were to:

1. Identify selected personal and professional characteristics of fourth grade teachers;
2. Determine the teachers' knowledge of agriculture;
3. Determine the teachers' perceptions of agriculture;
4. Determine the extent to which teachers teach about agriculture and use teaching methods that involve agricultural concepts;
5. Identify the type and degree of assistance that teachers would be most interested in to supplement their skills in teaching agriculture and agricultural concepts; and
6. Examine the relationships between and among the following: personal and professional characteristics, knowledge of agriculture, perceptions of agriculture, extent of teaching agriculture, use of agricultural concepts in teaching, and types of assistance preferred.

PROCEDURES

POPULATION AND SAMPLE

The population of this study was fourth grade teachers in Texas during the 1989-1990 school year. The researchers selected fourth grade teachers because that is the grade level in which science and social studies are to be introduced to children in Texas public schools (Texas Education Agency, 1987).

Due to the lack of a state roster of fourth grade teachers, the population size was estimated using procedures recommended by the Texas Education Agency. The group was found to be approximately 11,626 fourth grade teachers at 4140 schools. Because there was no home mailing list for these teachers, a cluster sampling technique was used to select a random sample. According to Borg and Gall (1983), in cluster sampling, the unit of random sampling is the naturally occurring group of individuals, in this case the school. Three-hundred schools were randomly selected to participate in the study and all fourth grade teachers at each of the sample schools were to take part. This procedure was expected to yield a sample of about 800 fourth grade teachers, more than twice the sample size recommended for a population exceeding 10,000 (Ott, 1986).

INSTRUMENTATION

The instrument used to collect the data of this study was a mailed questionnaire containing 97 items divided into five parts (Terry, 1990). Part I contained eight open-ended questions pertaining to personal and professional characteristics. Part II was used to determine the teachers' perceptions of agriculture and was composed of a single open-ended question -- "What is agriculture?" This method was similar to one used by Orthel, Sorensen, Shannan, and Riesenberg (1989) in their study of secondary students' perceptions of agriculture. Part III was made up of 25 multiple choice items designed to measure knowledge of agriculture. Part IV was comprised of questions to identify aspects of agriculture taught and resources used to teach agriculture. Finally, Part V contained nine questions addressing assistance programs using a five point, Likert-type scale. The choices were: Very Interested = 5, Interested = 4, Somewhat Interested = 3, Not Interested = 2, and Definitely Not Interested = 1.

The validity and reliability of the instrument were determined using a variety of techniques. Content validity was determined by a panel of experts (faculty members and graduate students from the College of Agriculture and Life Sciences and the College of Education at Texas A&M University). A pilot test using fourth grade teachers from five schools not included in the sample was also used to assess content and face validity. Cronbach's alpha was used to determine reliability on appropriate parts of the questionnaire. The alphas were: Part III, .57; Part IV, .89; Part V, .88. A special note should be made of the low reliability of Part III. The problems with that portion of the questionnaire were recognized following the pilot test. Some questions were re-written or re-designed. Finally, five of the twenty-five questions included in the questionnaire were not used in the analysis of the data. The researchers recognize that the alpha for Part III remains low; however, Nunnally (1976) suggested that a reliability of .50 to .60 will suffice in the early stages of research.

DATA COLLECTION

Due to the nature of the sampling procedure, the principal at each sample school was contacted and asked to coordinate the collection of data at his/her school building. The contact letter was sent on October 9, 1989 and contained information about the study and a request that the principals distribute, collect, and return completed instruments to the researchers. Three follow up notes were sent, and 70% (210/300) of the principals agreed to assist in this phase of the study.

Beginning November 15, 1989, a total of 900 questionnaires were sent to the cooperating schools. Up to three follow up notes were sent until the completed questionnaires had been returned. On February 16, the data collection phase of the study was concluded with a response rate of 57% (510/900). Upon analysis of the respondents, the researchers found that the sample adequately represented all geographical areas of Texas and community and school sizes. Further, according to Goldhor (1972), non-respondents are assumed to be similar to late respondents. In this study no differences were found between early respondents and late respondents; therefore, the results of this study were generalized to the population.

ANALYSIS OF DATA

Descriptive statistics were used to describe the teachers' personal and professional characteristics, knowledge of agriculture, perceptions of agriculture, teaching of agriculture, and type of assistance preferred. Pearson product moment correlation, t-test, and analysis of variance (ANOVA) were used to measure relationships between and among the variables.

The conventions used for describing relationships between and among variables were as follows: .70 or higher equals very strong association; .50 to .69 equals substantial association; .30 to .49 equals moderate association; .10 to .29 equals low association; and .01 to .09 equals negligible association (Davis, 1971). With t-test and ANOVA, an alpha level of p <.05 was used to detect statistical significance.

RESULTS

PERSONAL AND PROFESSIONAL CHARACTERISTICS

The 510 fourth grade teachers represented cities in all geographic areas of Texas. Seven percent of the teachers worked in communities with populations of less than 1000; 25% in cities of 1000 to 9999 people; 40% in cities of 10,000 to 99,999; and 28% in cities with populations over 100,000. Teaching experience of the group ranged from one to 44 years with a mean of slightly more than 12 years.

The personal characteristics of teachers included the following information: 32% of the teachers indicated that they had lived on a farm or ranch for at least one year beyond their eighth birthday; 26% stated that at some time in their life, they or their family had derived a major portion of their income from agriculture; 24% had been members of a 4-H club; only 4% had been FFA members and students of vocational agriculture; and 4% had taken at least one agriculture class in college.

KNOWLEDGE OF AGRICULTURE

The teachers' scores on the test of knowledge about agriculture ranged from 5% (1/20) to 85% (17/20) with a mean of 48.4%. The scores were classified using a grade scale format generally accepted in academic settings. The labels for the scale were modified for this particular test as follows: 90% - 100% equals superior knowledge; 80% - 89% equals acceptable knowledge; 70% - 79% equals moderate knowledge; 60% - 69% equals minimal knowledge; and less than 60% equals unacceptably low knowledge. As displayed in Figure 1, nearly three-fourths of the respondents had a score indicating unacceptably low knowledge about agriculture.

More than 70% of the teachers knew that George Washington Carver developed a variety of products from peanuts; mechanization was the primary reason for increased agricultural yields in the first half of this century; laying hens produce about 240 eggs per year; and veal is the meat of young cattle. Fewer than 25% of the group knew that Americans spend just 12% of their income on food or that poultry is the most highly integrated industry in agriculture. Fewer than 15% of the teachers were aware that one U.S. farmer produces enough food for about 75 people or that the commodity futures market permits producers to reduce risk through price protection.

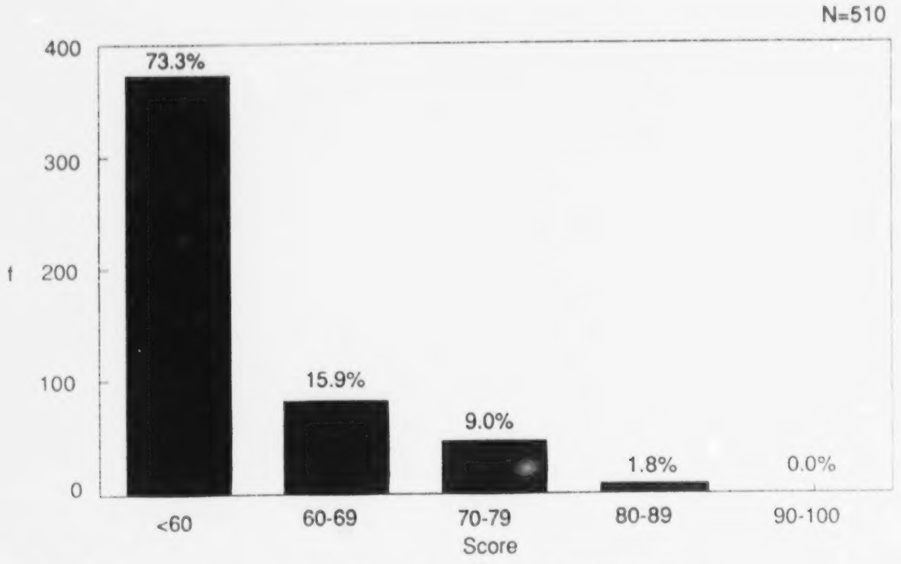

Figure 1: Teachers' scores on the test of knowledge about agriculture.

PERCEPTIONS OF AGRICULTURE

The teachers responses to the question, "What is agriculture?" were reviewed by the researchers and classified into one of two categories: 1) Agriculture is farming and ranching only; or 2) Agriculture is more than farming and ranching. Responses from over 90% of the teachers were classified in the category "Agriculture is farming and ranching only." In fact some teachers answered the question with the one word response, "farming." While other answers were more verbose, most teachers associated the term "agriculture" only with the raising of plants and animals.

TEACHING OF AGRICULTURE

When asked about the number of hours they teach agriculture, 75% of the teachers said that they taught the subject at least one hour per year. The average for the group was more than 16 hours per year, but the median was 8 hours per year. To the extreme, 11 teachers said that they taught agriculture 100 hours or more per year.

Teachers responded to questions soliciting specific information about their teaching of topics related to agriculture from a list of 14 items (Terry, 1990). The following topics: Sources of food, Nutrition and proper food selection, Ecology and environmental management, Plant growth and development, and Wildlife, were taught by over 75% of the teachers. Five percent of the teachers responded that they did not teach any of the topics listed on the questionnaire, while six percent indicated that they taught all of the 14 agricultural topics listed.

The instrument included 18 sources of materials that might be used in teaching agricultural topics (Terry, 1990). Fourteen percent of the teachers used none of the materials listed on the instrument. The most used source was chapters about agriculture in textbooks (71%). Ag in the Classroom and Food for America, materials that have received praise from the agricultural education community, were used by 11% and 5% of the teachers, respectively. The median number of material sources used by teachers was two.

From a list of five agricultural professionals, the teachers were asked to indicate those that they used as resource persons to assist them with their teaching of agriculture (Terry, 1990). Sixty-eight percent of the teachers stated that they did not use any of the professionals listed. The most commonly used agricultural resource persons were agricultural producers (18%), followed by county extension agents (17%), and agribusiness persons (8%).

Given a list of ten projects, the teachers indicated which projects related to agriculture they conduct with their classes (Terry, 1990). The most used project related to agriculture was the growing of plants which was used by over three-fourths of the teachers. Other popular projects included fish, or other aquarium animals and plants (35%), and insect projects such as ant farms and bee hives (35%). Eighty-two percent of the teachers used at least one of the projects included in the investigation.

Of the three programs given, taking students on field trips to agricultural expositions and field trips to agricultural businesses were participated in by 15% of the teachers. Only seven percent stated that their classes participated in Food For America of some other program conducted by the local FFA chapter or agricultural science department.

The results of this portion of the study also indicate some disparity in the teachers' knowledge about and/or perceptions of agriculture. While nearly 25% of the teachers said they taught agriculture zero hours per year, less than three percent indicated that they taught none of the topics related to agriculture, used none of the sources of agriculture teaching materials, or conducted none of the projects or programs related to agriculture.

TYPES OF ASSISTANCE PREFERRED

The teachers were asked to indicate the type of program they would prefer to assist them in their efforts to teach their students about agriculture. The respondents were most interested in the least structured programs that would allow them to work on their own such as receiving a list of reference materials. Of the more highly structured activities, the teachers preferred short workshops to long ones. On the other hand, of the graduate classes for credit, the teachers preferred the longer, three credit course to the courses in which they would earn fewer credits.

RELATIONSHIPS BETWEEN AND AMONG VARIABLES

Using the Pearson product-moment procedure, only negligible to low correlation was found to exist between various personal and professional characteristics and the other variables. In addition, no correlation over .19 existed between the teachers' score on the test of knowledge about agriculture or their perception of agriculture and any of the other variables. Moderate to substantial associations existed between variables such as total topics taught and hours spent teaching agriculture, number of materials used and number of resource persons used, and number of projects used and number of programs in which teachers participated.

T-tests revealed in-depth information about the teachers and their teaching of agriculture. Significant differences were detected between teachers who lived on a farm or ranch for at least one year beyond their eighth birthday and those who did not. Teachers with the farm and/or ranch background had more experience in vocational agriculture classes, more years in a 4-H club, and more teaching experience. In addition, this same group scored higher on the test of knowledge about agriculture, taught agriculture more hours during the year, taught more agricultural topics, used more agricultural professionals as resource persons, and had their classes participate in more programs related to agriculture. The specific topics that they taught more than the teachers who had not lived on a farm or ranch beyond their eighth birthday included: 1) Farm animals; 2) Agriculture in our history; 3) Agricultural careers; 4) Gardening; and 5) Role of agriculture in our economy.

Significant differences were detected based on other personal and professional characteristics. Teachers who had taken agriculture courses in college had a significantly higher score on the test of knowledge about agriculture, a more accurate perception of agriculture, and used more agricultural professionals as resource people than did their counterparts who did not take at least one agriculture course in college. Likewise, teachers with 4-H experience scored higher on the test of agricultural knowledge than those teachers without. They also used more resource persons, materials, and projects in their teaching of agriculture.

Significant differences were also found between teachers with five or fewer years of teaching experience and those with more than five years in the classroom. The more experienced teachers had a greater tendency to come from families that earn or had earned a major source of their income from agriculture, and they scored higher on the test of knowledge about agriculture. The younger teachers, on the other hand, were more interested in getting assistance in their teaching of agriculture by taking graduate courses worth two or three credits.

CONCLUSIONS AND RECOMMENDATIONS

The data indicate that the majority of teachers in Texas are teaching agriculture and agricultural concepts to their students; however, it is apparent that these teachers have inaccurate perceptions and limited knowledge of agriculture. In agreement with the recommendations of the Committee on Agricultural Education in Secondary Schools (1988), the researchers contend that efforts should be made to improve teachers' perceptions and increase their technical knowledge of agriculture to enhance their teaching of agricultural concepts.

The teachers with experience in some type of agriculture course or program have more accurate perceptions and greater knowledge of agriculture. In addition, these teachers use a greater number of resources to teach agriculture. These conclusions suggest that the teaching of agriculture in elementary schools could be promoted by providing teachers with opportunities to take courses in agriculture during their training in college.

The resource used most by fourth grade teachers in Texas for teaching about agriculture is chapters related to agriculture in textbooks. Agricultural educators should work to improve and expand such textbook units to increase the teaching of agriculture to elementary school children as opposed to developing separate materials for this purpose.

As the Committee on Agricultural Education in Secondary Schools (1988) found, "Virtually no effort is made anywhere to educate teachers about agriculture, except for the teacher education programs designed for vocational agriculture teachers" (p. 15). The results indicate that a variety of assistance programs should be promoted. A great number of fourth grade teachers in Texas are interested in receiving a list of materials and other resources to assist them in teaching about agriculture. While such lists have been developed, their availability must be increased. In addition, short in-service workshops and graduate courses for three credit hours should be developed to assist and encourage teachers in their efforts to teach about agriculture.

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ASSISTANCE NEEDED FOR ELEMENTARY TEACHERS IN TEXAS TO IMPLEMENT PROGRAMS OF AGRICULTURAL LITERACY

A Critique

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"Agriculture is too important a topic to be taught only to a relatively small percentage of students considering careers in agriculture or pursuing vocational agriculture studies...Beginning in kindergarten and continuing through twelfth grade, all students should receive some systematic instruction about agriculture" (National Research Council, 1988, p.1-2). These statements provided the incentive for conducting this investigation. The researchers chose to focus on elementary education citing literature substantiating the readiness and receptivity of elementary aged students to study and learn about "plants, animals, and the ways humans use them", and "environment and society."

Additional literature/research cited in the introduction found that "elementary teachers rate their knowledge of agriculture as low" (Bowers and Kohl, 1986; Swan and Donaldson, 1970), and, "elementary teachers would not be able to apply agricultural concepts in their teaching effectively without training or assistance" (Oliver, 1986). The introduction skillfully directed the reader to its closing statement and implied purpose..."little is known about the focus of such a program or the type of program format preferred by teachers."

This implied purpose was addressed by only objectives 4 and 5 of the 6 objectives of the study. The other four objectives did provide additional information specific to Texas, but could have been adequately explained by generalizing the findings of previous studies. The stated purpose, "assess 4th grade teachers' understanding and use of agricultural concepts and to determine if assistance is needed," was satisfactorily addressed in the review of literature/research. Here lies a concern...not with this particular study alone, but with much research presented at meetings and published in journals. We often conduct formula research...just like authors writing formula novels:

1. Identify those that do/have some activity/quality.
2. What do they think/feel/perceive about that activity/quality?
3. Correlate the thoughts/feelings/perceptions with demographics.

Objectives 4 and 5 were the focus of the study, but alone did not satisfy the demands of the formula. Objectives 1, 2, and 3 did add state specific information, but along with Objective 6, did little other than complete the research formula. No rationale was provided for Objectives 1, 2, 3, and 6.

The researchers did address the implied, literature derived purpose, used sound and appropriate research methodology, and presented a well-written paper. The findings of the study should provide Texas with direction to attack the limited and often negative perceptions of agriculture and the general lack of knowledge about agriculture among elementary (4th grade) teachers.

FACTORS RELATED TO THE PARTICIPATION OF AGRICULTURAL EDUCATION TEACHERS IN PROFESSIONAL DEVELOPMENT ACTIVITIES

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INTRODUCTION

The lack of teacher participation in professional development activities is an on-going concern to leaders in agricultural education across the country. Ryan (1987) emphasized the critical nature of professional development, suggesting that the nation annually spends two billion dollars to facilitate such programs. The National Research Council Committee on Agricultural Education in Secondary Schools (1988) recommended increased agricultural education teacher inservice involvement. This was not a revolutionary recommendation since agricultural educators have typically recognized the need for keeping current with both technical and pedagogical changes. Emphasizing the profession's concerns, all five of the 1986 issues of volume 59, The Agricultural Education Magazine, dealt with themes addressing "staying current." While increased involvement was encouraged, it was acknowledged that low participation frequently influenced the amount of time allocated for planning and facilitating professional development activities by state supervisors, teacher educators, and others responsible for conducting professional development activities (Duke, 1990; Hall, 1990).

Bowen (1987) and Couch (1989) emphasized balancing the amount of professional development with personal or family obligations. They investigated the relationship between personal and family factors with participation of agricultural education teachers in professional development activities, and raised the question of time constraints as important elements when considering factors related to participation in professional development activities.

Obviously, there is some doubt as to the effectiveness of professional development activities to improve teaching if a low percentage of teachers participate. Larger participation is desirable and would undoubtedly increase the potential impact of professional development activities. In order to increase participation, factors related to participation, including those dealing with personal and family obligations, needed to be identified. The researchers chose to use Pennsylvania as a model for identifying factors related to the participation of agricultural education teachers in professional development activities. The assumption was made that similar factors in other states relate to participation in professional development activities.

PURPOSE AND OBJECTIVES

The major purpose of this study was to identify specific factors related to participation in professional development activities. Specifically the objectives of this study were:

1. to describe the relationship between professional attitude and participation in professional development activities;

2. to describe the relationship or differences between selected demographic factors and participation in professional development activities.

METHODOLOGY

Design

A descriptive survey research design was used to collect data on teachers' professional development activity participation, professional attitude, and selected demographic factors.

Population

The study involved the entire population, or current census, of the agricultural education teachers in the state of Pennsylvania. There were 291 teachers included in the Directory for Agricultural Education in Pennsylvania 1989 - 1990.

Data Collection and Analysis

A questionnaire was developed and administered by mail to the 1989-90 population of Pennsylvania agricultural education teachers. The three-part questionnaire included statements/questions related to professional development participation, professional attitude, and demographics. The section of the questionnaire dealing with professional attitude was developed by Hall (1968) and revised by Snizek (1972). The remainder of the questionnaire was developed by the researchers. The instrument was pilot tested for content validity, clarity and distribution of responses with selected faculty and graduate students in the Department of Agricultural and Extension Education at The Pennsylvania State University. A "post hoc" test of the instrument resulted in a Cronbach's alpha reliability coefficient of .76.

After an initial mailing to the entire population of 291 teachers, and a follow-up mailing to nonrespondents, a 75.6 percent response rate was attained. Of the questionnaires returned, 215 (73.9%) were usable. Surveys from early and late respondents were compared with no significant differences found in the two groups; therefore, the researchers concluded that nonrespondents would have responded similarly had they chosen to participate (Miller & Smith, 1983). For statistical analysis the researcher considered the current census to represent a "slice of life" sample of the Pennsylvania agricultural education teachers (Oliver & Hinkle, 1981).

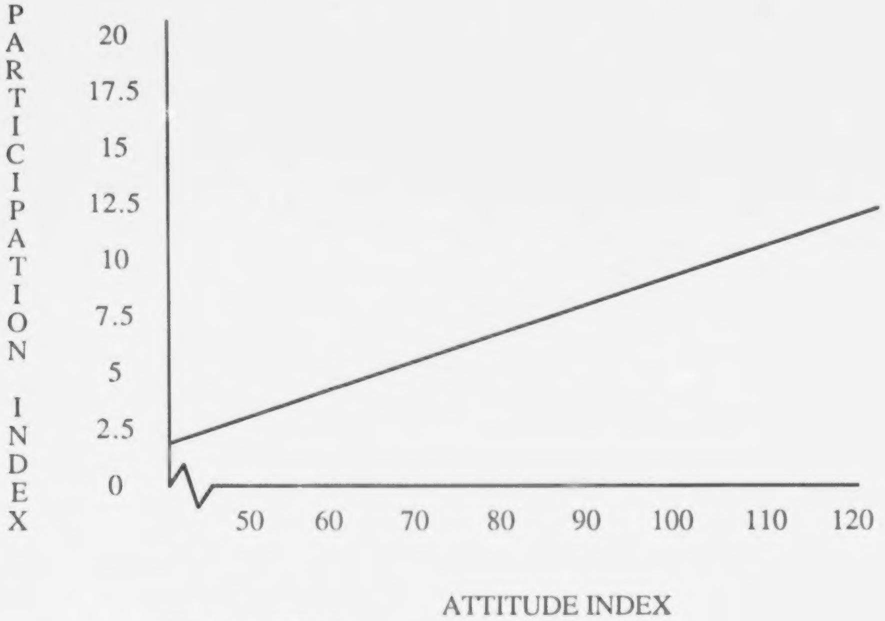
RESULTS

Professional Development Participation

Teachers reported their participation in professional development for the school years 1986-87, 1987-88, 1988-89. Participation data were collected in regard to professional organizations, professional development activities, and regular reading of professional/technical journals. Professional organization participation was evaluated based on payment of dues. Statewide professional development activities were listed as well as leaving blank lines for teachers to identify other local activities that they attended. The section on professional/technical journals regularly read was left completely open ended for responses. Analysis of the data yielded a participation index which was used as the basis for comparisons with attitude and selected demographic factors. The possible range of professional development indexes was 0 to 24.33. The actual reported range was 0 to 18.33, with a mean score of 6.92.

Professional Attitude Inventory

Teachers responded on a five-point Likert-type scale to 25 statements dealing with their professional attitude toward the agricultural education teaching profession. The 25 statements represented five separate statements grouped within five general categories. The raw data were converted to a professional attitude index. This was the only form in which the data were analyzed. None of the 25 questions was analyzed individually. The possible range of professional attitude indexes was 25 to 125. The actual reported range was 60 to 109 with a 84.96 mean. Objective 1 suggested a relationship between attitude and participation in professional development activities. The data suggested a significant positive relationship between the attitude index and the professional development index (Figure 1).



PPMr = .27813
Constant = .07735
2-Tailed Significance = <.0001

Figure 1. Relationship Between Professional Development Attitude Index of Pennsylvania Agricultural Education Teachers and Professional Development Participation Index.

Demographics

Objective 2 investigated the relationship between selected demographic factors and participation in professional development activities. Data for this objective were collected on 22 selected demographic factors. Appropriate analysis techniques, varying with the type of data collected, showed seven factors to have significant ($\leq .05$) relationships with the professional development index (Table 1). Six of the significant factors exhibited a positive relationship: former FFA membership, offspring teaching, financial contribution by local school district for Professional/Technical Institute, financial contribution by local school district for inservice, financial contribution by local school district for graduate credit, and length of contract. The only significant factor to show a negative relationship with the professional development index was holding a full-time summer job in addition to teaching agricultural education.

Other demographic factors which did not show a significant (<.05) relationship with participation in professional development activities included: highest degree completed, currently pursuing an advanced degree, years of ag teaching experience, numbers of ag teachers in the school, local school district paying for professional dues, local school districts paying for journal subscriptions, miles from PSU University Park Campus, coaching in addition to ag teaching, other extra duty in addition to ag teaching, part-time job during the school year in addition to ag teaching, owning a business or production operation in addition to ag teaching, gender, age, martial status, children under 18 years of age, father teaching, mother teaching and sibling teaching.

Table 1. Significant Relationships of Demographic Factors to Participation in Professional Development Activities. (N=215)

	Factor	**Probability**
1	Length of teaching contract	.000
2	Former FFA membership	.014
3	Local school district pays for Institute	.000
4	Local school district pays for inservice	.000
5	Local school district pays for graduate credits	.008
6	Summer job in addition to ag teaching	.000
7	Child teaches/taught	.007

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Objective 1: *To describe the relationship between professional attitude and participation in professional development activities.* The data suggest a moderately significant positive relationship between the attitude index and the participation index.

Attitude toward the profession of agricultural education teaching has a direct relationship with the participation of agricultural education teachers in professional development activities. The higher or more positive an agricultural education teacher's attitude toward the profession of agricultural education, the higher that teacher's level of participation in professional development activities.

This conclusion implies that an improved attitude toward the profession of agricultural education teaching might increase the participation in professional development activities. Beck (1990) explored many common theories regarding professional attitudes, motivation, and job satisfaction suggesting that this relationship is very complex. Beck further implied that teachers' attitudes toward their profession very definitely relates to their participation in professional development activities. Kahn (1984) suggested that attitude is a multidimensional factor that is formed differently in each person. In addition, Kahn noted the complexity of attitude relationships to behavior and suggested that attitudes are long lasting, complex, difficult to change, and would most likely influence a person's participation in professional development activities.

The following three recommendations are made in regard to objective 1.

1. Undergraduate involvement and student membership in professional organizations should be increased. Professionals tend to establish attitudes about their profession early in their career. Lawver and Lee (1988) found student membership to be the most important variable in predicting future professional organization participation by vocational agriculture teachers.

2. Members of state agriculture teachers' associations should "adopt" beginning teachers and include them in membership functions. Ryan (1986) described new teachers as being strangers in a familiar setting. They have spent a considerable amount of time in

schools but are strangers to the profession of teaching. The school surroundings are comfortable, but the perception of the school is much different from the teachers' side of the desk. Encouraging participation in professional development activities can be very instrumental in future involvement of these new teachers. Ross (1988) encouraged new teachers to be students of teaching. This type of behavior promotes participation in professional development activities.

3. State agriculture teachers' associations should waive conference or institute registration and meal costs for first-year participants. The data suggested that participation in such activities was significantly enhanced when a financial contribution of a teacher's local school district was made. Therefore, if the registration and meal costs were waived, theoretically, participation should increase within this professional development activity.

Objective 2: *To describe the relationship between selected demographic factors and participation in professional development activities.* Of the 22 demographic factors researched, seven were significantly ($\leq$.05) related to the professional development participation index. Five of the seven factors involved funding by local school districts. Those five included financial contributions by the local school district towards the Professional/Technical Institute, inservice, and graduate credit; length of contract and holding a full-time summer job in addition to teaching agricultural education. Former FFA membership and having offspring who teach were the only personal or family factors significantly related to participation in professional development activities.

The study implied that the financial contribution of agricultural education teachers' local school districts toward conferences and institutes, inservice, and graduate credits had a positive impact on their participation in professional development activities. The higher the level of financial contribution, the higher the level of participation. Maslow's Hierarchy of Needs Theory of Human Motivation (Hoy & Miskel, 1987), indicated that achievement of potential (professional development) will not be pursued if an individual is concerned with providing the necessities of life. Personal expense is very much a factor in the decision to participate in professional development activities. Therefore, if the cost is eliminated or lessened, teachers theoretically will participate in more professional development activities.

The data imply that agricultural education teachers' contracts should be extended to include full-time summer employment as an agricultural education teacher. This would eliminate the need for additional employment during the summer. If teachers not on full-time contracts are seeking additional full-time summer jobs, it can be implied that they need the salary. Lengthening teaching contracts will enable teachers to meet their basic salary needs, thereby motivating more teachers to participate in professional development activities.

A final implication indicates that agricultural education teachers with a former FFA membership background had a higher level of participation in professional development activities. This implication was substantiated by Lawver and Lee (1988) when they found that former FFA membership was the fifth most important variable in predicting professional organization participation by vocational agriculture teachers.

The following three recommendations are made in regard to objective 2:

1. Local school districts should be encouraged to provide financial support for participation in professional conferences and institutes, inservice, and graduate credits.

2. Local school districts should be encouraged to hire agricultural education teachers on contracts of 220 days or longer.

3. Former FFA members should be actively recruited to major in agricultural education.

Based on the findings of this study, the researchers recommend that efforts be made to improve agricultural education teachers' attitudes towards the profession, and to increase the financial support of local school districts for professional development activities. Notably, personal and family factors such as marital status and children at home, currently receiving general national attention, were found not to be significant. This suggests the need for further research in these ares.

In these times of increasing concern about the quality of preparation and competence of public school teachers, participation in professional development activities is very important. While this study was designed to focus only on agricultural education teachers, using Pennsylvania as a model, the results could easily be generalized to include teachers in other disciplines or agricultural education teachers outside the commonwealth of Pennsylvania.

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FACTORS RELATED TO THE PARTICIPATION OF AGRICULTURAL EDUCATION TEACHERS IN PROFESSIONAL DEVELOPMENT ACTIVITIES

A Critique

Stacy A. Gartin, West Virginia University--Discussant

The researchers are to be commended for taking a new approach to the age-old problem of teacher participation in professional development activities. Agricultural educators have long recognized the need for staying current with a technical and pedagogical changes. Constraints of time, money and philosophical differences continue to be associated with the low participation that is exhibited by secondary agricultural teachers in the area of professional development. The researchers did a good job of reviewing the literature and setting the stage for their study.

The following are a few observations and suggestions the authors may wish to consider as they continue their research.

- I would encourage the researchers to be more specific in the writing of their objectives. Objective 2 both identifies that relationships or differences will be analyzed. I would encourage the researchers to make this two separate objectives.

- What was the rationale for deciding to utilize your population as a sample? In the data reported the only statistic utilized was a Pearson product moment correlation which could have been replaced by using Rho.

- I believe space in the paper should have been appropriated to discussing how indexes were calculated, as well as what did index scores mean.

- I would encourage the researchers to utilize scales of measurement in order to discuss the direction and the magnitude of the relationships. The degree to which an item is significant is immaterial if it is less than or equal to .05.

- The researchers recommendations for objective two indicate that local school districts should be encouraged to hire Agricultural Education teachers on contracts of 220 days or longer. How did the researchers with the data they gathered identify 220 days?

I commend the researchers for exploring an important area of concern I feel that with clarity and presenting their methodology, findings and conclusions that the study will be useful in helping to encourage and promote professional development activities.

CURRENT AND EXPECTED ROLES IN SUPERVISING AGRICULTURAL SCIENCE AND TECHNOLOGY PROGRAMS IN UTAH

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INTRODUCTION

The authority for state supervision and administration of local programs of vocational agriculture was established by the Smith-Hughes Act of 1917. The Act mandated the development of a state board for vocational education for the planning of vocational education. The Act also provided for state-level administration of vocational education, including a state director and state-level supervisors of specific instructional areas (Roberts, 1971).

Early experts in educational administration identified the major function of supervision as the improvement of instruction (Wright and Allen, 1926). Dougan (1954) listed the perceived role of state vocational agriculture supervisors to include holding of conferences with teachers, attending workshops and technical meetings, and observing classroom teaching. Cornell (1976) found that providing leadership assistance in the improvement of teaching techniques was one of the most important tasks as perceived by district and state supervisors of trade and industrial education in Alabama. He concluded that providing leadership and assistance in the improvement of teaching techniques was one of the most important tasks as perceived by teachers, supervisors, and local administrators.

Schroeder (1962), in studying the role of state supervisors of vocational agriculture, collected the perceptions of the expected role of state supervisors from local teachers, local administrators, and state supervisors in eight states. He found that state supervisors identified their role as more directive than local teachers and administrators. Nasstrom and Baker (1979) identified a degree of discourse in considering the role of state and local supervisors. They found that 79 percent of the secondary principals and superintendents in Indiana believed that vocational classes should be approved according to state standards, but only 19 percent believed that state and federal agencies should determine the time allocated for vocational education classes. Roberts (1971) concluded that the primary goal of the state supervisor is the improvement of instruction. He further stated that federal funds were designed to stimulate states to provide state-level supervision of vocational programs. Wenrich and Wenrich (1974) reported that the emphasis in states has shifted from supervision of instruction to providing services. The role of state supervisors has shifted from one of "looking after" to one of leadership.

Changes in federal funding and state philosophy toward vocational education has resulted in numerous changes in state-level supervision in vocational agriculture. Karelse (1984) identified some of those changes in reporting the status of reductions in state staffs. The least desirable scenario was the use of outside, nonexperts in supervision (Mannebach, 1985). Wentling and Barnard (1982) offered rationale for a shift toward state-controlled federal compliance. They stated that the attitude toward program evaluation was greater for state-level administration than for the local education agency. Barrick and Straquadine (1988) found that the role of the state supervisor, as perceived by the teachers, increased between 1980 and 1986.

Olsen (1985) argued that local supervisors of vocational agriculture have the ultimate responsibility for planning and conducting relevant, high-quality programs. This could be confirmed by Straquadine's analysis of vocational agriculture program quality (1987). His national study concluded that the structure of state-level supervision did not contribute significantly to a standardized measure of program quality.

The Tenth Amendment legislates that education is the obligation of the state government (Friedman, 1971). However, local authorities have a vested interest in local programs. The role of state supervisors regarding local vocational programs may continue to change as the federal and state roles in education evolves.

PURPOSE AND OBJECTIVES

The purpose of this study was to examine the perceptions of Utah agricultural science and technology teachers (formerly known as vocational agriculture teachers) regarding the current and expected role of the state and local supervisor in agricultural education. The study was designed to answer the following research questions:

1. What is the current role of the state and local supervisor of agricultural science and technology as perceived by the Utah agricultural science and technology teachers?

2. What is the expected role of the state and local supervisor of agricultural science and technology as perceived by the Utah agricultural science and technology teachers?

3. How does the current role of the state and local supervisor compare with the expected role in Utah agricultural science and technology?

PROCEDURES

The target population for the study was the teachers of all agricultural science and technology programs in Utah that were considered vocational programs during the 1988-89 school year. The list of teachers in the population was provided by the state supervisor of agricultural education in Utah. Since only 64 teachers comprised this population, all individuals were studied. The 64 teachers were randomly selected into two groups of 32. The design for the study was descriptive survey. Data were collected by mailed questionnaire and used to describe the perceptions of the agriculture science and technology teacher regarding the current and expected role of the state and local supervisor.

The instrument used in collecting the data was similar to those used by Barrick (1981) and Barrick and Straquadine (1988) in studies of the role of state and local supervisors in agricultural education. Teachers responded to 37 activity statements related to the state and local supervisor. The 37 statements were designed to be grouped into the four sub-scales: (1) administrative activities, (2) improvement of instruction, (3) public relations, and (4) research and evaluation. Teachers indicated their perceptions of the role of the state and local supervisor in terms of the degree of authority. The degree of authority was indicated on a scale of one (no authority for the activity) to seven (a high degree of authority for the activity). The reliability coefficient for each sub-scale of the instrument ranged from .82 to .90. One-half of the population (n=32) was asked to indicate the current degree of authority of the state and local supervisor; the other half (n-32) were asked to indicate the expected degree of authority of the state and local supervisor.

ANALYSIS OF DATA AND RESULTS

Through support of the state director of vocational education and the persistent efforts of the researcher, a 100 percent response rate was achieved. Since all members of the population did respond and generalization of the results were limited to Utah agricultural science and technology, inferential statistics and levels of statistical significance were not necessary in analyzing the data.

Teachers responding to the current role of the state and local supervisor began teaching with a bachelor's degree in agricultural education. They averaged 11.4 years of teaching agricultural science and technology. Teachers responding to the expected role of the state and local supervisor averaged 12.1 years of agricultural science and technology teaching. Similar to the former group, the respondents in the expected group began their teaching career with a bachelor's degree in agricultural education.

The first objective of this study was to describe the agricultural science and technology teachers' perception of the current role of the state and local supervisor. The teachers rated the role of the state and local supervisor on 37 statements regarding supervisory activities. The 37 statements were designed to be grouped into the four activity categories: administrative activities, improvement of instruction, public relations, and research and evaluation. The teachers rated the state supervisor as currently having the greatest authority in directing improvement of instruction activities (see Table 1). The teachers rated research and evaluation activities as currently having the second highest degree of authority. Administrative activities, followed by public relations activities, completed the teacher's rating of the state supervisor's current degree of authority.

Table 1

Teacher Perceptions of the Current and Expected Role of the State and Local Supervisor in Utah Agricultural Science and Technology

	State Supervisor		Local Supervisor	
Activity	Current*	Expected	Current	Expected
Administration	2.93	3.48	5.37	6.00
Improvement of Instruction	3.83	4.81	5.17	5.83
Public Relations	2.84	3.51	5.71	6.41
Research & Evaluation	3.78	4.55	5.44	5.90

* 32 responses to the current role; 32 responses to the expected role

Response Scale: 1 = no authority in directing the activity
4 = some authority in directing the activity
7 = high degree of authority in directing the activity

The teachers also rated the current degree of authority the local supervisor has in directing the four categories of supervisory activities. The teachers rated the local supervisor's public relations activities as having the highest degree of authority. Research and evaluation activities were rated as the second highest degree of authority the local supervisor provides in supervising the agricultural science and technology program. Administrative and improvement of instruction activities were rated third and fourth, respectively. Teachers perceived local supervisors as having a lower degree of authority for these two activities.

The second objective of this study was to describe the expected role of the state and local supervisor. As Table 1 indicates, the teachers' perceptions of the expected role of the state supervisor rated improvement of instruction activities as having the highest degree of authority. The next highest degree of authority was identified as research and evaluation activities. The teachers' perceptions of the expected role of the state supervisor identified the lowest degree of authority for public relations and administrative activities.

Finally, the teachers rated the expected role of the local supervisor in supervising the agricultural science and technology program. The teachers expected the local supervisor to have the highest degree of authority in public relations activities. The teachers expected the local supervisor to have a higher degree of authority in completing administrative activities than research and evaluation activities. The teachers rated the expected role of the local supervisors as having the lowest degree of authority in completing improvement of instruction activities.

The third objective of the study was to compare the teachers' perceptions of the current role of the state and local supervisor with the expected role in Utah agricultural science and technology. An overall comparison of the current and expected ratings of the four categories of supervisory activities revealed that the teachers expected a higher degree of authority than was currently provided.

The teachers rated the current role of the state supervisor related to improvement of instruction activities as having the highest degree of authority. Similarly, the teachers expected the state supervisor to have the highest degree of authority in providing improvement of instruction activities. The teachers rating current state supervisor activities identified research and evaluation activities as having the second highest degree of authority. The teachers rating the expected role of the state supervisor responded in a similar manner. Although the teachers rating the current state supervisor activities indicated that administrative activities provided the third highest degree of authority, the teachers rating the expected role placed this activity as having the lowest degree of authority. Instead, the teachers rating the expected role of the state supervisor indicated that public relations activities should have a higher degree of authority than administrative activities.

The teachers rated the highest and lowest degree of authority for the current and expected role of the local supervisor in a similar pattern. The teachers' perceptions of both the current and expected role of the local supervisor indicated that the highest degree of authority was found in public relations activities. The perceptions of both the current and expected role rated the lowest degree of authority in improvement of instruction activities. The teachers rating the current role of the local supervisor indicated that the second highest degree of authority was related to research and evaluation activities. The teachers rating the expected role of the local supervisor indicated that research and evaluation activities should not have the second highest degree of authority. Instead, this group of teachers indicated that administrative activities should have the second highest degree of authority and that research and evaluation activities should have the third highest degree of authority.

CONCLUSIONS AND IMPLICATIONS

Several important conclusions can be drawn in comparing the current and expected role of the state and local supervisor. All teachers, both current and expected, rated the local supervisor as having a higher degree of authority in supervising activities in all four categories. The teachers have indicated that the state supervisor does not have greater authority in supervising any of these categories. Therefore, while the importance of leadership at the state level for agricultural education has been stressed philosophically, this study indicated that the teachers believe that the local supervisor has a greater degree of authority in agricultural education.

Independent of the mean rating of the four supervisory categories, the teachers ranked the current and expected role of the state and local supervisor in an interesting pattern. While the teacher's mean rating of the degree of authority of the state supervisor was below the local supervisor, the state supervisor's current and expected role related to improvement of instruction was highest among the four categories. In contrast, the teacher's mean rating of the degree of authority of the local supervisor in improvement of instruction activities was the lowest among the four categories. Therefore, it can be concluded that the teachers believe the state supervisor has greater authority in improvement of instruction activities than the local supervisor. In a sense, the teachers indicated that if the state supervisor is to exist, he/she should have the greatest degree of authority in improving instruction.

The teachers rated public relations activities in a similar contrasting pattern. The teacher's mean rating indicated that the state supervisor has the least degree of authority in public relation activities; yet the local supervisor has the highest degree of authority related to public relations. Therefore, it can be concluded that teachers believe public relations activities are best served through local supervisors.

In comparing the rankings of the expected degree of authority of the state supervisor, it was found that the teachers ranked administrative activities lower than the other three activity categories. Since the teachers rated administrative activities below the mid-point of the scale, it is concluded that teachers did not realize the degree of authority the state supervisor has in administering agricultural science and technology programs. Perhaps a misunderstanding of compliance versus assistance contributes to this low rating of a state administered function.

Finally, in reviewing the major findings of this study, one must consider a principal conclusion and recommendation of the Committee on Agricultural Education in the Public Schools (1988). This group stated that the success of reform in agricultural education programs relies on innovative programmatic leadership at the state and national levels. Therefore, leadership in state-level supervision should be taking the present system of agricultural education in Utah to the heights advocated by this reform committee. However, according to the current and expected perceptions of the teachers, the local supervisor has a greater role in the supervision of the agricultural education program. This perception could continue to handicap the state supervisor in bringing about innovative programs in Utah agricultural education.

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CURRENT AND EXPECTED ROLES IN SUPERVISING AGRICULTURAL SCIENCE AND TECHNOLOGY PROGRAMS IN UTAH

A Critique

Stacy A. Gartin, West Virginia University--Discussant

I would like to commend the author for selecting a very timely and important topic such as the Current and Expected Roles in Supervision of the Agricultural programs in his State. The supervision and administration of local programs as provided by state staff personnel is a very important and critical function within the profession.

The author should be commended for a very thorough review of the literature in setting the stage for his study. The purpose and objectives of the study were clearly written and the procedures for gathering the data were appropriate for this research. The researcher is to be commended for having an instrument with the reliability coefficient that range from .82 to .90 and for achieving a 100% response rate. The study was well done the data and results are clearly written, conclusions and implications support the findings of this research study.

I found it unique that the teachers which identified the current role of state supervisors to range in the no authority category. The highest rated of activities was the improvement of instruction which received a 3.83 mean rating, where as on the response scale a 4 only equaled some authority in directing activity. This would leave the reader to believe that the state supervisor presently has slightly less than some authority in directing the improvement of education rather than instruction.

I believe that readers of this study would gain by having the term local supervisor defined for them. Is the researcher talking in reference to the vocational director as a local supervisor, the local principal or superintendent? This definition of the local supervisor might provide clarity in understanding the ranking of current and expected teachers as to the role of public relations activity for being selected number one.

The major concern that this discussant has is, what new knowledge has been added to the total body of knowledge in agricultural education by conducting this? This study tends to support the findings of others as identified in the introduction of both the state supervisor and local supervisors of vocational agriculture.

I want to commend the researcher on his continued effort to examine the role of and importance of supervision in our profession.

AN ASSESSMENT OF THE LEADERSHIP PRACTICES USED BY AGRICULTURAL EDUCATION DEPARTMENT EXECUTIVE OFFICERS (DEOs)

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INTRODUCTION

The leadership role of the department executive officer (DEO) has become a critical element to the success of academic departments and the basic mission of higher education (McCarthy, 1986; Tucker, 1984). They indicated that recent technological, societal and demographic changes have forced administrators to look beyond traditional academic and administrative responsibilities for survival. According to Mannebach (1990), changes have also occurred at an unprecedented rate within agricultural education, agricultural industries and educational systems. Dramatic changes in student enrollment, as reported by Bowen (1987), in secondary, post-secondary and university programs in the College of Agriculture and Agricultural Education have stimulated concerns for accountability at all levels. Middlebrook and Trail (1986) indicated that the department executive officer (DEO) is the key leader in the academic department and is responsible for promoting faculty productivity. Leadership practices of the department executive officer in agricultural education must be identified and developed to ensure growth and prosperity of the profession.

A study conducted by McCarthy (1986) confirmed findings of other researchers that: (1) department chairperson's hold a "key" administrative and leadership role as first line managers that directly affects the success and growth of the department, (2) chairpersons are generally drawn from faculty ranks and assume the position having little or no administrative experience, (3) few opportunities for orientation and training are available to them, and (4) department chairpersons need, want, and deserve pre-service and in-service development in very specific areas. As the need for administrative leadership increases it will be more important for chairpersons to have professional training.

According to Kouzes and Posner (1988a), leadership is an observable, learnable set of practices. Based on this assumption, Kouzes and Posner contend that given the opportunity for feedback and practice, those with desire and persistence to lead can substantially improve their abilities to do so. Research has not been conducted to identify existing and needed leadership practices of DEOs in agricultural education. Such research is needed to further develop the leadership skills of department executive officers.

PURPOSE AND OBJECTIVES

The purpose of this study was to assess the leadership practices utilized by department executive officers (DEOs) in Agricultural Education. To accomplish this purpose the following research objectives guided the study.

1. To identify demographic characteristics of department executive officers, faculty members, and their departments.
2. To compare the self evaluations of agricultural education DEOs with the leadership practices reported by the faculty members.
3. To ascertain and compare leadership behaviors used by DEOs in agricultural education as reported by DEOs and faculty members.

4. To compare leadership practices of DEOs in agricultural education with norm data obtained from successful leaders in public and private companies.

PROCEDURES

The population for this study consisted of all Agricultural Education Department Executive Officers (DEOs), which included department heads, chairpersons, supervisors and coordinators. The sample population for this study was selected based on the following criteria: each DEO must have at least one faculty member (assistant professor, associate professor, or full professor) with an agricultural education appointment under his/her supervision. Fifty-six agricultural education department executive officers (DEOs) met the above criteria, therefore one randomly selected faculty member affiliated with each DEO was also identified to participate in the study. The 1989-90 Directory of Teacher Educators in Agriculture was used to obtain names and addresses of the participants.

The Leadership Practices Inventory (LPI), developed by J. M. Kouzes and B. Z. Posner (1988a), was used to identify leadership practices currently utilized by department executive officers. They indicated that when leaders perform at their best, they (1) challenge the process; (2) inspire a shared vision; (3) enable others to act; (4) model the way; and (5) encourage the heart. The LPI consists of 30 leadership behavior statements which were used to determine a mean and composite score for each of these five leadership practices. Participants used a 5-point Likert scale to respond to each leadership statement: "1" meant the leader "rarely or never" does this; "2" meant the leader does this "once in a while"; "3" meant the leader "sometimes" does this; "4" meant the leader does this "fairly often"; and a response of "5" indicated the leader does this "very frequently or always."

The LPI consists of Part A, a self evaluation which was completed by each DEO and Part B which was completed by a faculty member to identify leadership practices used by their DEO. Several demographic questions were added to the first portion of each instrument to obtain general information from each respondent. Part A of the LPI was mailed to each department executive officer along with a cover letter explaining the purpose and confidentiality. Permission was obtained from the DEO before Part B was sent to their faculty member. Two weeks were allowed for each respondent before follow-up contacts by telephone and letter were initiated. Nonrespondents were further contacted to encourage participation. At the conclusion of the data collection period, eighty-nine percent of the DEOs provided useable returns and forty-one matched pairs of DEOs and faculty members were obtained.

The instrument had high internal reliability as a result of extensive testing and retesting of the instrument by the authors. The internal reliabilities for each of the five leadership practices were reported as follows: challenging the process (.77), inspiring a shared vision (.88), enabling others to act (.84), modeling the way (.80), and encouraging the heart (.90).

ANALYSIS OF DATA

The results of the demographic survey and LPI instrument were analyzed with the assistance of the SPSSx Statistical Package for the Social Sciences. An alpha level of .05 was used to identify significant differences when appropriate.

Means and frequencies were computed for the demographic questions, leadership practices and leadership behaviors for each DEO and faculty member respondent. The SPSSx t-test pairs program was used to identify significant differences between responses of the DEO and their faculty member. Results from respondents and late respondents were compared; no significant differences were found.

A composite score was determined for each of the five leadership practices by adding responses to six preselected leadership behavior statements. Kouzes and Posner (1988b) used composite scores, obtained from successful leaders in public and private companies, to develop norms for each of the five practices. The 30th and 70th percentiles were used to differentiate between low, medium and high levels of utilization for each practice. Composite scores obtained in this study were compared to the norm groupings to determine the level of utilization of each of the five leadership practices by Agricultural Education DEOs.

RESULTS

Job responsibilities identified by the DEOs indicated a broad range of responsibilities beyond administration and leadership. Only five DEOs indicated that they held a 100 percent administrative appointment, while eight respondents indicated that they did not have a specific percentage of their job allocated to administrative duties. DEOs indicated that teaching was a primary responsibility in their position.

The majority of department executive officers in agricultural education have had less than six years of experience and were in the age range of 41 to 50 years of age. Ninety percent of the DEO respondents indicated that they do not have a college degree in administration, although 71 percent of the respondents have completed courses in administration and supervision.

Sixty-seven percent of the respondents reported that they have not taken a college course in leadership, and 36 percent of the respondents received no formal leadership training.

Nearly half of the DEOs indicated their job descriptions did not include specific administrative responsibilities, while two-thirds did not have specific leadership responsibilities identified. Eighty-three percent of the DEO respondents indicated that they did not receive a quality orientation program.

A t-test pairs program identified a significant difference at the .01 level when comparing DEO and faculty responses regarding the leadership practice, "enabling others to act" (Table 1). As a group, faculty members consistently rated the DEOs in agricultural education lower than the DEOs self evaluations on each of the five leadership practices included in this study.

Significant differences were also found between DEO and faculty member responses on the following leadership behaviors: involving others in planning, treating others with respect, creating a climate of trust, getting others to feel ownership for their projects, allowing others to make decisions and practicing what is espoused (Table 2). Five of these leadership behaviors were used to determine the level of utilization of the leadership practice "enabling others to act".

Department executive officers who indicated greater than 25 percent of their time for administrative responsibilities reported a significantly higher level of utilization of the two leadership practices: "inspiring a shared vision" and "encouraging the heart". It was also noted that DEOs with less than 25 percent teaching responsibility indicated a significantly higher level of utilization of the leadership practice "inspiring a shared vision" than DEOs with greater teaching responsibilities. Department executive officers who have received formal leadership training indicated a significantly higher level of utilization of the leadership practice "encouraging the heart" than DEOs who have not.

Composite scores of department executive officers for the leadership practice

Table 1. Comparison of the leadership practices used by the department executive officer as perceived by the DEO and a corresponding faculty member using the t-test pairs program.

Leadership Practice	N	DEO Mean S.D.	Faculty Mean S.D.	t-Value	Prob
Challenging the Process	40	3.7042 0.499	3.4625 0.829	1.67	0.104
Inspiring a Shared Vision	41	3.7520 0.619	3.5163 0.965	1.25	0.220
Enabling Others to Act	41	4.3821 0.419	3.8537 0.927	3.31	0.002**
Modeling the Way	40	3.8625 0.490	3.6917 0.835	1.18	0.246
Encouraging the Heart	41	3.8618 0.643	3.6463 1.008	1.05	0.298

** Significant at the .01 level

"challenging the process" placed 50 percent of the DEOs in the low level of utilization of this practice. Faculty members supported this finding by placing 44 percent of the DEOs in agricultural education in the low level of utilization of this leadership practice. The composite score for each respondent was determined by adding the responses to the following leadership behaviors: seeks challenges; stays up-to-date; challenges the status quo; looks for ways to innovate; asks "What can we learn?"; and experiments and takes risks.

For the leadership practice "inspiring a shared vision", 36 percent of the DEOs identified themselves in the high level of utilization. Forty-one percent of the faculty members surveyed agreed that their DEO exhibited a high level of utilization of this leadership practice. The composite score for this leadership practice was determined by adding responses to the following leadership behavior statements: describes future we can create; shares future dreams; communicates positive outlook; enlists a common vision; forecasts the future; and contagiously excited about future.

Department executive officers disagreed on the level of utilization of the leadership practice "enabling others to act" (Figure 1). Forty-eight percent of the DEOs surveyed indicated that they exhibited a high level of utilization of this practice, while forty-eight percent of the faculty members indicated that their DEO exhibited a low level of utilization of this practice. Composite score for this leadership practice was determined by adding responses to the following leadership behavior statements: involves others in planning; treats others with respect; allows others to make decisions; develops cooperative relationships; creates atmosphere of trust; and gets others to own project.

Thirty-four percent of the DEOs indicated a high level of utilization of the leadership practice "modeling the way". Although thirty-seven percent of the faculty members agreed

Table 2. Leadership behaviors used by the department executive officer perceived significantly different by DEOs and corresponding faculty members using the t-test pairs program

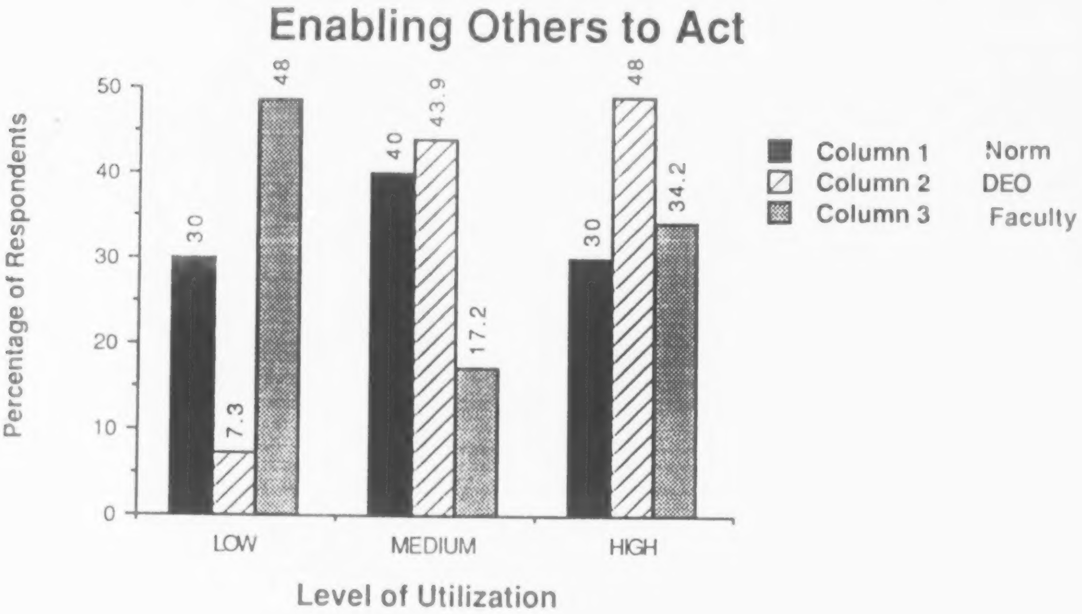
Leadership behaviors	DEO Mean S.D. N=41	Faculty Mean S.D. N=41	t value	prob
Involves others in planning	4.3659 0.662	3.7317 1.119	3.00	0.005 **
Treats others with respect	4.7073 0.512	4.1707 0.972	3.43	0.001 **
Allows others to make decisions	4.4634 0.552	4.0488 0.805	2.59	0.013 *
Creates atmosphere of trust	4.2439 0.699	3.6585 1.175	2.96	0.005 **
Practices what is espoused	4.4390 0.776	3.9512 1.139	2.36	0.023 *
Gets others to own project	4.31771 0.521	3.6341 1.260	3.29	0.002 **

** Indicates significant difference at .01 level
* Indicates significant difference at .05 level

that their DEOs had a high level of utilization of this practice, 45 percent of the faculty surveyed indicated that their DEO exhibited a low level of utilization of this practice. The composite score for this leadership practice was determined by adding responses to the following leadership behavior statements: clear on leadership philosophy; breaks projects into chunks; assures values are adhered to; lets others know beliefs/values; practices what is espoused; and sets clear goals and milestones.

Composite scores reported for the leadership practice, "encouraging the heart", indicated that thirty-nine percent of faculty members identified their DEO in the low level of utilization for this practice. This was in contrast to the composite scores reported by the DEOs which indicated that thirty nine percent of the DEOs have a high level of utilization of this leadership practice. This leadership practice composite score was determined by adding the responses to the following leadership behavior statements:
celebrates milestones; recognizes others' contributions; gives praise for a job well done; gives team appreciation/support; finds ways to celebrate; and tells others about group's work.

Figure 1. Number of DEOs in the low, medium and high categories for utilization of the leadership practice, enabling others to act.



CONCLUSIONS

Based on the data analyses and findings of the study, the following conclusions were formulated:

1. The current job responsibilities identified by the DEOs in the study indicated a broad range of responsibilities other than administration and leadership. DEOs had primary responsibilities in teaching and administration.

2. DEOs who have received formal leadership training had a higher level of utilization on all five leadership practices when compared to DEOs who have not. A significantly higher level of utilization was identified regarding the leadership practice, "inspiring a shared vision".

3. The majority of DEOs do not have specific leadership responsibilities identified in their job description and quality orientation programs have not been provided for DEOs.

4. A major discrepancy exists between department executive officers and faculty members perceptions of the DEOs ability to use the leadership practice "enabling others to act". This discrepancy could greatly affect the successful utilization of this leadership practice.

5. When compared to norm data, nearly half of the DEOs and faculty members agree that DEOs in Agricultural Education have a low level of utilization of the leadership practice "challenging the process".

6. DEOs and faculty do not agree on the DEO's level of utilization of each of the following leadership behaviors: involving others in planning, treating others with respect, creating a climate of trust, getting others to feel ownership for their projects, allowing others to make decisions and practicing what is espoused.

7. According to faculty members, a large percentage of DEOs have a low level of utilization of the following leadership practices: "challenging the process", "enabling others to act", "modeling the way" and "encouraging the heart" when compared to norm data.

8. DEOs with greater than 25 percent of their job responsibilities allocated to administration had a higher level of utilization of the leadership practices: "inspiring a shared vision" and "encouraging the heart" than DEOs with less responsibility allocated.

9. DEOs with greater than 25 percent teaching responsibility indicated a significantly lower level of utilization of the leadership practice, "inspiring a shared vision" than those DEOs who have less teaching responsibility.

RECOMMENDATIONS

1. Department executive officers in agricultural education should establish a strong communications network with other agricultural education programs and departments, especially in departments where professional staff is limited.

2. Department executive officers in agricultural education should have greater than 25 percent of their job responsibility in administration and have less teaching responsibility to allow them to have more available time for department leadership.

3. Department executive officers in agricultural education should enhance their leadership skills through formal leadership training.

4. Each DEO should have his/her professional staff evaluate his/her leadership practices and behaviors using the LPI. DEOs who have leadership practices identified in the low and medium categories for level of utilization should seek assistance in those areas and develop a plan for improving the leadership practices and behaviors needed in their positions. Special attention should be given to the leadership practices: challenging the process, and enabling others to act.

5. Specific areas for potential leadership training to be considered for DEOs and faculty in agricultural education include the following leadership behaviors. involving others in planning, treating others with respect, creating a climate of trust, getting others to feel ownership for their projects, allowing others to make decisions, and practicing what is espoused.

6. College administrators should provide quality orientation and in-service programs to assist DEOs in understanding the administrative and leadership responsibilities of their positions.

IMPLICATIONS FOR FURTHER STUDY

Based on the findings and conclusions of the study, the following recommendations for additional research are submitted for consideration:

1. Leadership practices and behaviors identified in the low category of utilization should be evaluated further in order to identify barriers to their current usage by DEOs.
2. The leadership practice "enabling others to act" should be further researched to determine potential barriers and techniques which could be used to improve the utilization of this leadership practice.
3. Research should be conducted to determine specific leadership and administrative responsibilities identified in current DEO job descriptions, and recommendations should be made for areas of improvement.
4. Research should be conducted to review other departments in the College of Agriculture as to orientation programs, job descriptions, and training programs provided to assist DEOs in performing their leadership and administrative duties.

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AN ASSESSMENT OF A LEADERSHIP PRACTICES USED BY AGRICULTURAL EDUCATION DEPARTMENT AND EXECUTIVE OFFICERS "DEOs"

A Critique

Stacy A. Gartin, West Virginia University--Discussant

I would like to commend the researchers for conducting a study and writing a paper that scholarly. The researchers selected a topic very timely to the profession as we continue to evolve and move forward into the next century. The authors did a thorough job of reviewing the literature and setting the stage for the topic in which they studied. The purpose and objectives for the study were clearly identified and written. The procedures were clearly explained as to the selection of DEOs the instrument, the content validity and reliability to gather the appropriate information from the population. The results were clearly presented. The researchers stayed within their limits in drawing conclusions from the results of their study.

The following are a few observations and suggestions the authors may wish to consider as they continue their research.

- The analysis and use of data in analyzing demographics with leadership behaviors of the DEOs might be of value in looking at the entire picture.

- I would raise question that the size of faculty working with the DEO may have an influence on how the faculty member rated the DEO. Often with small faculties the DEO sees himself as an equal team member and not in the form or does not want to take on the form or role of being "The Boss". So, therefore, might the size of faculty, age of faculty, as well as the time spent together on the same faculty have an influence on the perceptions of faculty members on their DEO.

- In the methodology section the researchers clearly identify that a .05 alpha-level would be utilized to identify significant differences within their sample population. If .05 is set apriori then why do the researchers want to utilize a significant level a reporting significant level of .01 in both tables 1 and 2.

In conclusion I find the paper well written and of value to the Agricultural Education profession. I commend the researchers for exploring an important area of concern I feel that the results in the form of feedback will indeed assist DEOs in improving in their role as an administrator.

READER OPINIONS OF THE JOURNAL OF AGRICULTURAL EDUCATION

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The JOURNAL OF AGRICULTURAL EDUCATION is the primary refereed journal for the agricultural education profession. Formerly THE JOURNAL OF THE AMERICAN ASSOCIATION OF TEACHER EDUCATORS IN AGRICULTURE, the JOURNAL is published by the American Association of Teacher Educators in Agriculture.

Williams (1982) conducted the last readership survey of JOURNAL readers almost ten years ago by enclosing a survey instrument in a single issue (Volume 23, Number 2) of the JOURNAL. The respondents indicated that they used the JOURNAL in a variety of ways and felt that the JOURNAL helped them learn about research findings and develop professionally. The respondents felt that three issues of the JOURNAL was inappropriate and that more were needed (the JOURNAL was consequently changed to four issues per year). Respondents rated the JOURNAL highly on research findings, length of articles, pages per issue, quality, style, and format. The respondents were pleased with the JOURNAL and felt the JOURNAL kept them up-to-date.

The three most common methods of conducting readership surveys of publications are telephone interviews, placing a survey instrument in an issue of the publication, and by mailed questionnaires. Mail survey is viable method of collecting data to improve publications (Kinsley, 1987). Mail surveys are less expensive than telephone surveys and the response rate is better than with surveys included in an issue of the publication.

Readership surveys are fairly common in popular magazines but are seldom used with professional journals. When professional publications are evaluated, the evaluations usually fall into one of two broad categories. The first category of evaluations is an evaluation of the quality of the work published in the publication. The evaluator may try to determine if the work in a publication is of comparable quality to that in other publications (for example, see Hall, Ward, & Comer, 1988). Another type of evaluation that would fall into this category is when the statistical methodology used in a journal is analyzed to determine if the profession is keeping up with the times (for example, see Bowen, Rollins, Baggett, & Miller, in press).

In the second category, the publication is evaluated on its readability, its quality of editing, the appropriateness of its policies, and its effectiveness. This is the type of evaluation presented here.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to determine AATEA member's opinions about the effectiveness, policies, and quality of the JOURNAL OF AGRICULTURAL EDUCATION. Specific objectives of the study were:

1. to determine how AATEA members use the JOURNAL and the extent of their use;

2. to determine the member's opinions of the effectiveness of the JOURNAL's policies and procedures; and

3. to determine the member's opinions of how the JOURNAL could be improved.

METHODOLOGY

The design of the study was a descriptive mail survey. The researcher obtained the JOURNAL mailing list and determined an accessible population of 381 individuals. Other entries on the mailing list, such as libraries and other organizations, were not included in the accessible population. From the accessible population, a random sample of 80 AATEA members was selected for participation in the study based on the formula recommended by Cochran (1977) with adjustments made for expected undeliverable letters and an expected response rate of about 80%.

The individuals in the sample were mailed a cover letter and questionnaire with a follow-up postcard mailed 8 days later. A second letter and questionnaire were mailed 14 days after the postcard to the 18 individuals who had not yet responded.

The instrument used for the study was designed by the researcher, using some of the questions from the instrument used in Williams' (1982) survey of the JOURNAL. Content validity was established for the instrument by a panel of experts, including recent editors of the JOURNAL and other AATEA members. Responses to individual questions are reported, so a coefficient of internal consistency for reliability was not obtained.

Four of the original mailings were returned as undeliverable, leaving an accessible sample of 76. Sixty-seven usable responses were obtained, for a response rate of 88%. A follow-up of three of the nine nonrespondents showed them to be no different from the respondents with regard to their responses to the questions on the questionnaire.

Frequencies, percentages, means, and standard deviations were calculated and used in the data analysis.

FINDINGS

The mean number of years the respondents had been reading the JOURNAL was 12 years, with a standard deviation of 1.06. The low was one year (one respondent) with several respondents indicating they had been reading the JOURNAL since it has been published since 1961.

Twenty-four (35.8%) of the respondents indicated that they read between 1 and 25% of the JOURNAL. Twenty-seven (40.3%) read between 26 and 50%. Eleven (16.4%) read between 51 and 75%. Five (7.5%) read between 76 and 100%. Although they were given the option, none of the respondents indicated that they read none of the JOURNAL.

The respondents were asked to respond to 12 yes/no questions designed to determine how the JOURNAL was being used by its readers. Frequencies and percentages of respondents indicating yes to these questions are given in

Table 1. The five most frequently indicated uses of the JOURNAL were: (a) cited an article from the JOURNAL; (b) shared an article with a colleague; (c) used the article in a graduate class; (d) used an article to learn research methodology; and, (e) used an article in a research class. Although not an objective of the study, it should be noted that more people had reviewed an article for the JOURNAL (53.7%) than had published an article in the JOURNAL (44.8%).

Table 1

Frequencies and Percentages of Respondents' Use of the JOURNAL

	Positive Responses	
Use of the JOURNAL	Frequency	Percent
1. Cited an article from the JOURNAL	55	82.1
2. Shared an article with a colleague	55	82.1
3. Used an article in a graduate class	43	64.2
4. Used an article to learn research methodology	42	62.7
5. Used an article in a research class	39	58.2
6. Submitted an article for publication	37	55.2
7. Reviewed an article submitted for publication	36	53.7
8. Published an article in the JOURNAL	30	44.8
9. Used an article in an undergraduate class	30	44.8
10. Used an article to develop a philosophy	27	40.3
11. Assigned an article to a research class	24	35.8
12. Assigned an article to an undergraduate class	13	19.4

Respondents were asked to rate the effectiveness of the JOURNAL by responding to eleven questions presented with an anchored scale with 1 = strongly disagree and 5 = strongly agree. Means and standard deviations for each statement are given in Table 2. The statements with which the respondents agreed, in order, were: 1) Reviewers have the most influence as to which articles get published; 2) The format of the JOURNAL is acceptable; 3) Overall, I am pleased with the JOURNAL; 4) The JOURNAL publishes high-quality articles; 5) The JOURNAL keeps me well-informed about agricultural education research and innovations; and, 6) The problems studied are important to theory/practice in the profession. The statements with which the respondents disagreed were: 1) Articles is the JOURNAL are too short; 2) Fewer research articles should be published; 3) The editor has the most influence as to which articles get published; 4) Articles in the JOURNAL are too long; and, 5) Photographs or line art should be included in the JOURNAL.

Table 2

Respondents' Level of Agreement with Selected Statements Regarding the Effectiveness of JOURNAL Policies and Procedures

	Statement	Mean	SD
1.	Reviewers have the most influence as to which articles get published.	4.05	.825
2.	The format of the JOURNAL is acceptable.	3.91	.848
3.	Overall, I am pleased with the JOURNAL.	3.67	.746
4.	The JOURNAL publishes high-quality articles.	3.66	.930
5.	The JOURNAL keeps me well-informed about agricultural education research and innovations.	3.51	.990
6.	The problems studied are important to theory/practice in the profession.	3.25	.927
7.	Photographs or line should be included in the JOURNAL.	2.85	1.184
8.	Articles in the JOURNAL are too long.	2.66	1.023
9.	The editor has the most influence as to which articles get published.	2.45	.991
10.	Fewer research articles should be published.	2.40	1.207
11.	Articles in the JOURNAL are too short.	2.33	.960

Note. Scale: 1 = strongly disagree, 5 = strongly agree.

When asked how much they thought the editor should influence which articles get published, 6% responded "none," 52% responded "very little," 40% responded "much," and 2% responded "very much."

The respondents were also asked if they were in favor of selling advertising in the JOURNAL. Sixty-three percent indicated that they would be in favor of selling advertising. When those that said yes to advertising were asked what types of advertising might be appropriate, 64% indicated personal services advertisements, 81% indicated advertisements for instructional materials, and 88% indicated position announcements. Two respondents indicated a preference for a review or publishing fee.

At present, the JOURNAL lists the following as appropriate topics for articles: (a) current trends and issues; (b) descriptions or analyses of innovations; (c) evaluations; (d) philosophical concerns; and, (e) research in agricultural education. The respondents were asked to indicate what percentage of the JOURNAL's space they thought should be allotted to each. The mean, standard deviation, low percentage, and high percentage for each topic are given in Table 3. Research in agricultural education was clearly the topic respondents felt should be given the most space. Research was followed by, in order, current trends and issues, descriptions or analyses of innovations, philosophical concerns, and evaluations.

Table 3

Respondents' Opinions of the Percentage of JOURNAL Space That Should Be Devoted to Each Type of Article

Topic	Mean*	SD	Low	High
1. Research in Agricultural Education	43.62	19.4	10	90
2. Current Trends and Issues	18.37	10.2	0	50
3. Descriptions/Analyses of Innovations	14.22	8.3	0	35
4. Philosophical Issues	12.38	6.6	0	33
5. Evaluations	11.40	7.1	0	30

* Mean refers to the mean percentage allocated to the different topics by the respondents.

To determine ways in which the respondents felt the JOURNAL could be improved, they were asked to complete this statement: "I think the JOURNAL could be improved by . . ." A variety of responses to this statement were obtained and categorized by the researcher. The most frequently occurring response (10 respondents) was by publishing more articles per issue and/or more issues per year. Five respondents would like to see more non-research articles published. Four respondents would like to see more articles published about innovations. Four respondents indicated that the JOURNAL could be improved by broadening the focus. Recommendations made by three respondents included: publishing more articles about university and community college agricultural education; publishing shorter articles; making the print easier to read; placing more emphasis on philosophical issues; publishing fewer articles about traditional vocational production agriculture; and more leadership articles.

CONCLUSIONS

The following conclusions were drawn as a result of the findings of this evaluation:

1. Readers want to see more articles published per year and think the JOURNAL should advertise to offset the increased costs.

2. The present format, length of articles, quality of articles, and problems addressed by the articles in the JOURNAL are satisfactory.

3. The JOURNAL fills a need for the agricultural education profession.

4. The review process used at present is satisfactory to the members.

IMPLICATIONS AND RECOMMENDATIONS

The following implications and recommendations are based on the findings and conclusions of this evaluation:

1. The present procedures for reviewing and selecting articles for publication in the JOURNAL should be continued.

2. The quality of published articles and the importance of the problems studied in the JOURNAL are satisfactory.

3. The Editing-Managing Board of the JOURNAL should consider publishing more articles per issue and/or more issues per year.

4. The Editing-Managing Board of the JOURNAL should consider selling advertising to offset increased publishing costs. Another possibility would be charging a review or publishing fee.

5. The AATEA should consider whether two publications might better serve the needs of its members. One, possibly the JOURNAL OF AGRICULTURAL EDUCATION, could publish articles on trends, innovations, philosophy, and evaluations of programs. A second, possibly The JOURNAL OF AGRICULTURAL EDUCATION RESEARCH, could publish articles on the cutting edge of research in agricultural education.

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READER OPINIONS OF THE JOURNAL OF AGRICULTURAL EDUCATION

A Critique

Stacy A. Gartin, West Virginia University--Discussant

This study addresses an area of concern for our colleagues and the profession. The author did a fine job of reviewing the literature to identify when the Journal of Agricultural Education was last evaluated and the types of evaluations that are conducted on journals.

I would have liked to have seen a further and more extensive review of the literature as it relates to professional journals and the type of evaluation that relates to the readability, the quality of editing, and the appropriateness of its policies and its effectiveness as indicated by the researcher. The purpose and objectives were clearly identified. The methodology was sound and appropriate statistics were used. The results and conclusions and recommendations are consistent with the findings. However, I do believe it would have been informative to the reader if the analyses would have been broken down by regions. I would encourage the researcher to continue to investigate the responses received for the level of agreement as to the affectiveness of the journal policies and procedures since none of the 11 selected statements received a "strongly agree" rating.

I commend the researcher for exploring an important area of concern with profession and the editing managing board of the Journal of Agricultural Education. I hope that the editing managing board, the editor, and the profession will discuss and analyze the conclusions and recommendations made by the researcher of this study.

THE IMPORTANCE OF COMPUTER SKILLS FOR ENTRY LEVEL EMPLOYMENT IN NORTH CAROLINA PERCEIVED BY HORTICULTURE PROFESSIONALS AND AGRICULTURE TEACHERS

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INTRODUCTION

Over the past 20 years, the microcomputer has matured into a useful technological tool enabling people to efficiently process information at home, in school, and at the work place. Microcomputers are useful in agriculture as writing, data processing, accounting, and management tools; as controlling units for remote sensor irrigation devices; and as instruments for climate control (Camp, Moore, Foster, & Moore, 1988). However, even with increased accessibility to microcomputer technology, it still remains that a number of agricultural industries, particularly small businesses, do not use microcomputer technology (Newman, 1986).

In agricultural education, early research in computer technology sought to answer the question as to who had computers (Henderson, 1985; Miller and Kotrilk ,1986; and Malpiedi & Blake,1987). The focus moved to how computers were being used. In Ohio, 66% of the teachers used computers for instruction (Malpiedi, Papritan, & Lichtenstiger, 1985) and 23% in North Carolina (Malpiedi & Blake, 1987). Primary uses of the computer have been in the area of data management, for student information, particularly SAE data and for instructional management (Foster and Miller, 1984; Miller & Kotrilk, 1986; Malpiedi & Blake, 1987; and Zidon & Luft, 1987). Microcomputers are more accessible, less expensive, and friendlier than they were 20 years ago. Yet the profession still wrestles with the amount of microcomputer instruction or microcomputer use that should occur in agricultural education classrooms.

The rapid changes in agriculture involving computer technology, imply that computer skills need to be acquired by agricultural education graduates. A question that remains is what are the most important computer skills for students to possess in order to succeed in entry level agriculture/agribusiness occupations? What skills should be taught with the aid of computers ? Iowa and Nebraska agriculture teachers rated 24 competencies as highly important with 17 of the competencies in the area of specific skills related to using hardware and software (Foster & Miller, 1984). Newman (1986) reported that teachers perceived computer skills to be slightly more important for entry level occupations than did industry representatives. However, their rankings were similar where using a data base, learning basic computer skills, and using word processing were highly important. Spotanski (1987) surveyed Nebraska agriculture teachers and business managers. The findings contradicted the literature as the computer related skills fell into the "seldom to never used" category.

Obviously, the views of employers vary from state to state and from industry to industry. For competency based programs that propose to employ graduates in entry level employment, what is taught must relate to what is needed. Thus, this study was needed to be used during the North Carolina curriculum revision process as one means to assess employer and teacher perceptions of needed computer competencies. This study focused on computer competencies needed for entry level employment in horticulture, rather than the entire agricultural/agribusiness industry.

PURPOSE AND OBJECTIVES

Little information is available on the computer skills needed for entry level employment in horticulture in North Carolina. The research was needed to validate competencies being considered for the revised horticulture curriculum. The main purpose of this study was to determine a specific list of computer skills needed by students for entry employment in horticulture in North Carolina. A secondary purpose of the study was to determine current and future instructional computer uses. The research objectives for this study were:

1. To determine teachers' perceptions of the importance of selected computer skills for entry level employees in horticulture.
2. To determine if there are relationships between selected demographic variables and the importance of teaching computer competencies.
3. To determine employers' perceptions of the importance of selected computer skills for entry level employees in horticulture.
4. To determine the relationship or extent of agreement between teachers' and employers' mean order rankings of the importance of selected computer skills for entry level horticultural occupations.
5. To determine the frequency with which selected competencies in horticulture education at the high school level were currently taught with the aid of a computer and which ones could be taught with the aid of a computer.

Limitations of the Study

1. The study is limited in its generalizations to the horticulture teachers and their programs in North Carolina.
2. Since one published listing of all horticultural businesses in North Carolina is not available, the researchers accepted the assumption that the identified horticulture businesses were the industry leaders in North Carolina and that their views were reputable for the profession in North Carolina.

PROCEDURES

Research Design

The study was descriptive research design, using survey techniques, with the major purpose of describing selected characteristics of respondents. Descriptive research studies are designed to obtain information concerning current status of phenomena (Borg and Gall, 1983).

Population and Sample

The population for this study included 161 horticulture teachers in North Carolina. The names of teachers in North Carolina who teach horticulture were listed in the state Professional Personnel Activity Report (PPAR) and were verified by state consultant in Agricultural Education, Doug Powell and Chief consultant in Agricultural Education, Charles Keels. A random sample of 113 teachers, based on the Krejcie and Morgan (1970) formula, was selected with the sample proportion at .05 and a 95% confidence level. Given a normal response rate of 70% in North Carolina, an additional 12 teachers were selected as replacements to insure sufficient returns for data analysis. A purposive sample of 17 horticulture businesses was selected by a panel of experts. The panel included two horticultural specialists at North Carolina State University, Dr. Bill Fonteno and Dr. Jim Bilderback; and the Executive Secretary of the North Carolina Nurserymen Association, Bill Wilder. The panel selected the businesses based on the criteria that the business is recognized as a leading horticulture industry in the state and that the business uses computers in their operation.

Instrumentation

The instruments used in this study were researcher designed. For the teachers, the Newman (1986) instrument was used as a basis for designing items to determine computer competency importance. It was further modified by the investigator by deleting the section on time spent using the computers by teachers and employers.

Part one of both the teacher and horticulture business instruments consisted of 10 computer competencies to be rated on a Likert-type scale using four points ranging from 1 being not important to 4 being very important. Midpoints of the scale were used for interpretation purposes.

Part two of the teacher instrument included a list of competencies added from the North Carolina Curriculum Guide for Agricultural Education which pertained only to horticulture related skills. The competencies were identified in a previous study (Browning & Malpiedi, 1987) as ones which could be taught with the aid of a computer. The skills from the North Carolina Curriculum Guide were used by teachers to rate the current and potential use of computers to teach each skill listed. The third part of the both instruments elicited demographic data.

Content validity was determined by a panel of experts including three university professors, five horticulture teachers, and the North Carolina Chief Consultant in Agricultural Education. A pilot test and retest was given to determine reliability. The coefficient of stability as a measure of reliability was .98.

Data Collection

The researcher mailed coded instruments, including self-addressed, stamped envelopes, to 125 horticulture teachers and 17 horticultural businesses in North Carolina. All of the businesses that were named by the specialists received a survey. A follow-up letter and instrument was mailed two weeks after the initial mailing to those teachers and businesses which had not responded. A return rate of 88.24% resulted when 15 of the 17 businesses that were surveyed responded.

After a second mailing, a return rate of 62% was accomplished for the horticulture teachers. The researcher mailed a third letter and instrument and achieved a final return rate of 71.2% for the teachers with 89 usable returns. Having completed three mailings, the researchers compared data from early and late respondents and determined no differences. Since late respondents are similar to nonrespondents (Miller & Smith, 1983) no other follow-up procedures were used since no significant differences were found.

ANALYSIS OF DATA

The Statview program for the Macintosh computer was used to analyze the data obtained from the surveys. Descriptive statistics were used including frequencies, percentages, and measures of central tendency in reporting the data. Pearson's product moment correlation coefficient was used to determine if there were any relationships between selected demographic variables and the importance of teaching computer competencies. A Spearman rank-order correlation coefficient was calculated to measure the extent of agreement between rankings of the teachers and businesses.

RESULTS

Characteristics of the Study Groups

On the average, horticulture teachers in North Carolina reported having almost 11 years of teaching experience. However, the most frequently reported level of teaching experience was three years indicating that several teachers of horticulture had much less experience than the average horticulture teacher. Horticulture was taught in schools with an average enrollment of 947 students. On the average, 55 students were enrolled in the horticulture program. However, 50% of the programs reported having 50 or fewer students.

Ninety-one percent of the programs had computers available to the teachers and students with 67% having one or more computers in the horticulture department. The teachers use the computers primarily for teaching preparation (64.05%), personal use (59.55%), student data management (51.69%), teaching horticulture related activities (43.82%), and finally 29.21% in managing the greenhouse. The teachers have completed from 1 to 10 computer workshops (M = 2.35) and from

1 to 6 university credit computer courses (M = 1.02). No significant relationship ($p > .05$) was found between teaching experience (r= -.12) or computer education (r=.11) and the teacher's perceptions of the importance of teaching computer skills. However, younger teachers tended to rate the importance of learning computer skills higher than older teachers.

The types of horticultural business operations represented in this study were 33.33% wholesale nursery, 26.67% wholesale/retail nursery, 26.67% wholesale greenhouse, 13.33% retail greenhouse. The number of employees ranged from 2 to 120. The horticultural businesses in this study tended to employ fewer than the average 44 people with 50% of the businesses employing 20 or fewer people.

The Importance of Computer Competencies

As displayed in Table 1, teaching basic skills was moderately to very important, followed by using a data base, mailing list, word processor, and computerized greenhouse control as moderately important computer skills to know. According to teachers, the other four competencies: obtaining market information, using integrated software, and computer assisted management decisions were of slight importance.

Employers also perceived that learning basic computer skills was moderately important. Differing from teachers, employers rated using a computer to obtain market information as moderately important. This competency ranked second in comparison to teachers' mean rating which placed the competency seventh on their list. According to the employers, using a data base was of slight to moderate importance while using the computer for word processing, mailing lists, spreadsheets, or management decisions was of slight importance for entry level employees. The ability to use integrated software was not viewed as being important by employers.

Table 1
A Comparison of the Importance of Computer Competencies as Rated by Horticulture Teachers and Horticultural Employers

Competencies	Teachers' Mean	SD	Mode	Horticulture Businesses' Mean	SD	Mode
Basic computer skills	3.48	1.00	4	3.07	1.33	4
Data base management	2.89	.97	3	2.40	1.24	2
Merging mailing lists	2.80	1.11	4	2.07	1.22	2
Word processing	2.79	1.06	3	2.07	1.28	2
Spreadsheet analysis	2.62	1.11	2	1.67	.98	2
Greenhouse control	2.55	1.08	2	2.13	1.30	1
Market information	2.44	1.15	2	2.68	1.35	4
Integrated software	2.41	1.04	2	1.47	1.06	2
Management decisions	2.26	1.08	2	1.60	1.18	2

Note: The scale was: 1 - 1.5 = NOT IMPORTANT, 1.51 - 2.5 = SLIGHTLY IMPORTANT, 2.51 - 3.5 = MODERATELY IMPORTANT, and 3.51 - 4 = VERY IMPORTANT. Midpoints were used for interpretation.

Teachers rated the importance of teaching computer competencies to students who are preparing for entry level employment in the industry slightly higher than the employers. A Spearman rank-order correlation coefficient (r_s) of .63 was achieved, yet it fell short of the critical value of .66. Thus, no statistically significant relationship ($p > .05$) was found indicating that the rankings are independent and that teachers and employers are not in agreement on the rankings.

Ranking unweighted mean scores revealed that overall, learning basic computer skills was the most important to both groups. Both groups acknowledged the importance of students learning data base management skills and mailing lists. Teaching students to make management deceisions using the computer is slightly important, but last on the list.as displayed in Table 2.

Table 2
Overall and Individual Rank Order of the Importance of Computer Competencies as Perceived by Horticulture Teachers and Horticulture Business Leaders

Competencies	Unweighted Mean	Teachers Rank	Employer Rank
Basic computer skills	3.28	1	1
Data base management	2.64	2	3
Merging mailing lists	2.56	3	6
Word processing	2.43	4	6
Spreadsheet analysis	2.43	5	7
Computer greenhouse control	2.34	6	4
Obtaining market information	2.14	7	2
Using integrated software	1.94	8	9
Computer Asst. management decisions	1.93	9	8

Note: The scale was: 1 - 1.5 = NOT IMPORTANT, 1.51 - 2.5 = SLIGHTLY IMPORTANT, 2.51 - 3.5 = MODERATELY IMPORTANT, and 3.51 - 4 = VERY IMPORTANT. Midpoints were used for interpretation. Rank order analysis: $r_S = .63, p > .05$, c.v. .66).

Teaching Computer Competencies: Current and Future Applications

All 19 horticulture competencies were taught to some extent with the aid of a computer. Primarily, those competencies listed in Table 3 that related to data management, including supervised agricultural experience programs (SAEP), and word processing activities, specifically writing a speech, were noted as the ones actually taught by the greatest percentage of teachers. It is interesting that less than 30% of the teachers use the computer to teach any one of the competencies. The next most frequent use of the computer was in teaching identification skills and tutoring in FFA Leadership competencies. While teachers are rarely using the computer to manage the greenhouse, to make management decisions, or use of networks, over 80% see the potential for doing so.

The Perceived Importance of Computers in Education

The teachers and employers were asked to respond to the following questions: Why are microcomputers important or not important to horticulture education? Why are microcomputers important or not important to the horticulture industry? Sixty percent of the teachers responded to these questions. Only one teacher indicated that computers were not important. The teacher indicated that "quality software was not available for horticulture and computers can not teach". The consensus of the positive responses was that computers are important to horticulture education because horticulture students are moving forward with technology to become more efficient in planning, organizing, and calculating. Specifically, teachers said: "Computer are the thing of the future"; "Computers are handy tools, but they can not replace teachers"; "Using a computer reduces the time I spend doing paperwork so I can spend more time on my lessons".

Twelve of the 17 employers responded to the questions. All responses were favorable as to the importance of computers in education and the horticulture industry. Specifically, they said: "They are a coming tool. As good labor becomes more expensive and difficult to find we will have to rely more heavily on machines"; "Computers are becoming more common in every section of the business world and will be more so in the future"; They will be used more to do things like spraying, sowing, bench time, and all inventory will be kept on it in the future".

Table 3
Frequencies and Percentages of Horticulture Competencies Taught by Computer Aided Instruction or Having the Potential for Computer Aided Instruction

Competency	Do Use the Computer		Potentially Useful	
	f	%	f	%
Writing speeches	25	28.09	84	94.38
Record book, data management	24	26.97	88	98.88
Plant parts identification	22	24.72	75	84.27
Ag Experience student data	20	22.47	86	96.63
Budgeting greenhouse accounts	16	17.98	86	96.63
Parliamentary procedure	15	16.85	60	67.42
Network market information	14	15.73	79	88.76
Bedding plants identification	14	15.73	76	85.39
Turf grasses varieties	14	15.73	77	86.52
FFA history	13	14.61	71	79.78
Greenhouse /nursery management.	13	14.61	88	98.88
Calculate herbicide application rates	11	12.36	78	87.64
Safe herbicides application	9	10.11	59	66.29
Fertilizers ID & application	9	10.11	70	78.65
Soil mixtures	9	10.11	71	79.78
Creating landscapes/CAD	9	10.11	81	91.01
Turf liming & care	8	8.99	75	84.27
Floral scheduling	8	8.99	81	91.01
Manage lighting & shading systems	5	5.62	73	82.02

CONCLUSIONS

Based on the perceptions of teachers and employers, it is important for horticulture students who desire entry level jobs in the profession to possess basic computer competencies, including how to operate the computer and to use simple programs. It is also moderately important for them to manage data with a computer, particularly if the information is from a market data source.

For entry level employment in horticulture, teachers place greater importance on the traditional computer applications such as developing basic skills, data base management, and spreadsheet operations rather than teaching students to use the computer as an information or facility management tool.

The perceptions of the importance of using computers is not significantly related to teaching years of experience or computer education level. These two characteristics should not limit a teacher's capacity to use or to teach with computers.

Employers place moderate importance on a student's need to have basic skills in computer use as well as an ability to use the computer to obtain market information and manage data such as inventories. Employers tended to rate the skills lower than the teachers.

Teachers and employers are not in agreement as to the relative importance of the selected computer skills with the exception of teaching students basic computer skills. According to the rankings of the mean ratings, it is more important to employers than to teachers for students to use computers for obtaining market information and for greenhouse control.

Computer aided instruction is used to some extent in teaching all 19 horticulture competencies identified in the North Carolina Curriculum Guide. Teachers are using computers minimally, for the traditional uses, and not maximizing the potential for computer aided instruction.

RECOMMENDATIONS

Teachers need to include or see to it that these basic computer skills are taught to every horticulture student. Every teacher does not need to teach every student all there is to know about computers. Given basic skills, students could adapt to the computer uses and/or equipment of the industry.

An effort needs to be made to resolve the disagreement between teachers and employers as to the importance of the various computer competencies. Employers may not be aware of the computer training and experience high school students now have available. Teachers need to become familiar with the computerized equipment and information network sources of the industry so that the teachers can assist students in developing computer competencies in these areas.

Teacher educators and state staff need to continually address the need for assisting teachers in their being technologically current with the industry. This need may be met through coordinating or teaching relevant workshops and/or courses.

Educational programs need to continue to focus on helping teachers use computer assisted instruction in horticulture as well as to assist teachers in maximizing the potential use of computers, which they identified, in horticulture.

The North Carolina curriculum development teams need to incorporate basic computer operation competencies in the horticulture courses and suggest computer management and network teaching activities as appropriate in the curriculum.

Further research needs to be conducted to determine how well the computer competencies served graduates of the horticulture programs. Research needs to continue assess the impact of technology on our programs.

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THE IMPORTANCE OF COMPUTER SKILLS FOR ENTRY LEVEL EMPLOYMENT IN NORTH CAROLINA PERCEIVED BY HORTICULTURE PROFESSIONALS AND AGRICULTURE TEACHERS

A Critique

Paul R. Vaughn, Texas Tech University--Discussant

Strong Points Of The Paper/Study

This is another example of a well written paper. The authors have done a good job of identifying the need for the study and writing the purpose and objectives. Other commendable aspects of the study are:

- Identifying the limitations of the study
- Using a random sample based on Krejcie and Morgan's formula
- Addressing the issue of expected response rate by reviewing past studies conducted on similar groups
- Using a pilot test on the instrument
- Checking content validity of the instrument by using a panel of experts
- Measuring reliability with a test-retest procedure
- Using follow-up procedures
- Comparing late respondents to nonrespondents

In summary, the study followed accepted research procedures. The authors did an excellent job in writing the conclusions to show that they were based on the perceptions of teachers and employers. The study has contributed significantly to the knowledge base about using computers for horticultural instruction in North Carolina

Questions About The Study

In reviewing the study, the following questions arose:

- Since the sample of horticultural businesses was a purposive sample, can it be considered representative of employers of horticulture graduates from North Carolina Schools?

- Why must the differences between teachers and employers on the importance of certain computer skills be resolved (as recommended by the authors) ? Aren't there computer skills that should be taught besides those that are deemed important by the employers? Such as general skills that might be useful in personal life?

- On what characteristics were the early and late respondents compared? Were they alike in all aspects? What statistical analysis was done?

- Why do the authors recommend that educational programs need to help teachers use computer assisted instruction (CAI) in horticulture? The findings only show that the teachers do not use CAI to a great extent. There was no finding that indicated teachers do a poor job of teaching horticulture or that CAI would enhance the instruction that was currently taking place.

THE USE OF COMPUTER SOFTWARE PROGRAMS IN SPECIFIC AGRICULTURE TOPICS

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INTRODUCTION

Although computers have been in schools for over a decade, some students have yet to be given the opportunity to incorporate the use of computers in agriculture. Camp, Moore, Foster, and Moore (1988) encouraged students to think of computers as remarkable tools that can make agricultural tasks easier to do, while doing them quickly and accurately. Students, however, must know what tasks can be done with computers and what software can be used to accomplish these tasks. As agriculture teachers incorporate computers into student learning, they are faced with similar decisions; that is, what can be taught with computers and what software should be used?

An advantage to using computers in education is their versatility. Kuchinskas (1983) listed 22 ways that computers could be used in reading and language arts classes. Lockard, Abrams, and Many (1987) discussed five categories for using the computer as a tool, three categories using it as a tutor, and four categories using it as a learner. Camp et al. (1988) cited several ways students could use computers in educational and occupational situations. They stated the following:

> Computers can assist in determining what crops and livestock to grow and/or raise, determining the types and amounts of pesticides or fertilizers to use, determining when to replace livestock, and projecting current and future values.
>
> Agricultural accounting software can help with business transactions and accounting procedures such as income, expenses, inventory, depreciation, accounts payable, accounts receivable, payroll, employee scheduling, and taxes. (pp. 14-15)

Bork (1981) suggested the topic which computers are used for may determine the effectiveness of the program. He stated:

> Useful ways to involve computers in learning may depend on the subject matter involved. What is highly effective in physics may turn out to be useless for literature. This is obvious with computational uses, which are tailored for a specific need. (p. 9)

PURPOSES AND OBJECTIVES

The purpose of this study was to determine if certain types of computer software were being used more than other types for specific agriculture topics. In addition, did teachers perceive some types of software to be more valuable than others? The specific objectives of the study were:

1. To determine which software programs were being used in secondary

agriculture programs.

2. To determine the agricultural topics in which students were using computers.
3. To determine the extent to which students were using specified types of microcomputer software programs in specified agriculture topics.
4. To determine the perceived effectiveness of software programs that were being used in agricultural instructional programs.
5. To determine what relationships existed between the perceived value of software programs and the extent the programs were being used.

METHODS

The population of the study consisted of 9,093 secondary agriculture programs in the United States as listed in the Agriculture Teachers Directory (Henry, 1988). The sample size was determined by the calculation of the formula suggested by Hinkle, Wiersma, and Jurs (1988, p. 310). The calculated sample size of 323 programs was increased to 600 based on the response rate of a similar national study by Miller and Kotrlik (1986).

Faculty members from three universities reviewed the survey instrument to provide content validity. Reliability was established by pilot testing the instrument with agriculture teachers who were not in the randomly selected sample. Cronbach's coefficient alpha was calculated to be 0.90 on the pilot test and 0.94 on the instrument when it was sent to the survey sample.

On March 28, 1989, a computer disk survey instrument was mailed to 600 randomly selected secondary agriculture teachers. A postcard reminder was sent after two weeks. A paper form of the instrument was mailed on May 1, 1989, to the teachers still not responding. The collection of data was terminated on May 15, 1989. Data collection resulted in a usable response rate of 44.1 percent. After a telephone survey, nonrespondents were determined not to differ from respondents in the areas their students used computers.

Table 1. Frequency of Use of Specific Types of Software (N=256)

Type of Software	frequency	percent
Word processing programs	138	53.9
Educational games	133	52.0
Decision aid programs	121	47.3
Drill and practice programs	118	46.1
Spreadsheet programs	90	35.2
Data base programs	88	34.4
Graphics programs	63	24.6
Telecommunication programs	49	19.1
BASIC programming	32	12.5

ANALYSIS OF DATA

Data were analyzed using SPSSx. Frequencies and percents were used to describe the use of specific types of software and the agriculture topics in programs where computers were used. These data can be found on Tables 1 and 2. Frequencies, percents, and standard deviations were used to determine the combination of use of specific software in each agricultural topic. Table 3 illustrates the results of these computations.

Table 2. Frequency of Computer Use in Specific Agriculture Topics (N=256)

Topic area	frequency	percent
Livestock production	157	61.3
Agricultural mechanics	147	57.4
Crop production	141	55.1
Agriculture supplies and service	111	43.4
Horticulture	103	40.2
Agricultural (natural) resources	94	36.7
Agricultural products processing	80	31.3
Forestry	62	24.2

Table 3. Means and Standard Deviations of Level of Use of Software in Specified Subject Areas

Software/Subject Area	n	Percent of total (N=256)	Mean[a]	S.D.
Spreadsheet programs				
Crops	74	28.91	2.23	0.79
Livestock	83	32.42	2.82	0.91
Agricultural supplies and service	53	20.70	2.66	1.07
Agricultural mechanics	49	19.14	1.90	0.82
Agricultural products processing	32	12.50	2.13	0.98
Horticulture	27	10.55	2.22	0.93
Agricultural (natural) resources	27	10.55	1.93	1.14
Forestry	21	8.20	2.05	0.87
Drill and practice programs				
Crops	83	32.42	2.30	0.80
Livestock	91	35.55	2.55	1.04
Agricultural supplies and service	61	23.83	2.23	1.02
Agricultural mechanics	80	31.25	2.68	1.03
Agricultural products processing	40	15.65	2.10	0.93
Horticulture	60	23.44	2.70	1.83
Agricultural (natural) resources	48	18.75	2.17	1.00
Forestry	29	11.33	2.48	1.12

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[a] Level of use rated on a scale where 1=rarely, 2=seldom, 3=moderate, 4=heavy, and 5=extensive.

Table 3. (continued)

Software/Subject Area	n	Percent of total (N=256)	Mean[a]	S.D.
Educational games				
Crops	98	38.28	2.33	0.97
Livestock	107	41.80	2.47	1.07
Agricultural supplies and service	71	27.73	2.35	1.12
Agricultural mechanics	79	30.86	2.17	1.06
Agricultural products processing	43	16.80	2.00	0.98
Horticulture	54	21.09	2.15	0.92
Agricultural (natural) resources	49	19.14	2.49	1.23
Forestry	29	11.33	2.35	1.05
Decision aid programs				
Crops	93	36.33	2.77	0.87
Livestock	104	40.63	2.74	0.88
Agricultural supplies and service	65	25.39	2.19	0.98
Agricultural mechanics	77	30.08	2.20	1.08
Agricultural products processing	45	17.58	2.09	1.00
Horticulture	53	20.70	2.45	1.15
Agricultural (natural) resources	41	16.02	2.17	1.11
Forestry	27	10.55	2.22	1.05
Telecommunications programs				
Crops	37	14.45	2.68	1.13
Livestock	41	16.02	2.59	1.14
Agricultural supplies and service	25	9.77	2.48	1.04
Agricultural mechanics	16	6.25	1.69	1.20
Agricultural products processing	13	5.08	2.08	1.12
Horticulture	11	4.30	1.82	0.98
Agricultural (natural) resources	12	4.69	1.83	1.19
Forestry	5	1.95	2.60	1.82
Word processing programs				
Crops	91	35.55	2.12	1.01
Livestock	96	37.50	2.31	1.07
Agricultural supplies and service	81	31.64	2.57	1.17
Agricultural mechanics	67	26.17	1.91	1.00
Agricultural products processing	47	18.36	2.19	1.06
Horticulture	55	21.48	2.35	1.06
Agricultural (natural) resources	51	19.92	2.12	0.99
Forestry	33	12.89	2.18	1.10
Data base programs				
Crops	60	23.44	2.27	0.94
Livestock	63	24.61	2.40	1.06
Agricultural supplies and service	50	19.53	2.42	1.25
Agricultural mechanics	50	19.53	1.90	0.95
Agricultural products processing	32	12.50	1.94	1.19
Horticulture	29	11.33	2.48	1.46
Agricultural (natural) resources	24	9.38	1.71	0.96
Forestry	21	8.20	2.05	0.97

Table 3. (continued)

Software/Subject Area	n	Percent of total (N=256)	Mean[a]	S.D.
Graphics programs				
Crops	31	12.11	2.00	0.82
Livestock	37	14.45	1.73	1.02
Agricultural supplies and service	27	10.55	2.37	1.18
Agricultural mechanics	29	11.33	2.00	1.25
Agricultural products processing	18	7.03	1.78	1.26
Horticulture	23	8.98	2.52	1.20
Agricultural (natural) resources	15	5.96	1.53	0.74
Forestry	11	4.30	2.36	0.92
BASIC Programming				
Crops	23	9.89	2.00	1.04
Livestock	22	8.59	2.27	1.24
Agricultural supplies and service	16	6.25	2.25	1.07
Agricultural mechanics	13	5.08	2.46	1.27
Agricultural products processing	7	2.73	1.57	1.51
Horticulture	9	3.52	2.22	1.03
Agricultural (natural) resources	12	4.69	2.00	1.21
Forestry	6	2.34	2.83	1.17

Table 4. Means and Standard Deviations of Composite Teachers' Ratings on Factors Relating to Perceived Value of Selected Types of Software

Factor/type of software	n[a]	Mean[b]	S.D.
Software is motivational and educational			
Spreadsheets	90	7.55	1.54
Drill and practice	116	8.56	1.15
Educational games	131	9.20	1.06
Decision aids	120	8.25	1.22
Telecommunications	49	7.23	1.67
Software wastes students' and teacher's time			
Spreadsheets	90	5.28	2.05
Drill and practice	116	4.08	1.61
Educational games	131	3.99	1.69
Decision aids	120	4.64	1.78
Telecommunications	49	6.03	2.37

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[a] Number of departments where students used software as a part of their agriculture classes.

[b] Rated on a scale where 1=very strongly disagree, 2=strongly disagree, 3=moderately disagree, 4=mildly disagree, 5=very mildly disagree, 6=neither agree nor disagree, 7=very mildly agree, 8=mildly agree, 9=moderately agree, 10=strongly agree, and 11=very strongly agree.

Teachers rated the value of specified types of software by agreeing or disagreeing with ten statements on each type of software. Factor analysis was used to determine if common factors could be identified from the ten statements. Two factors resulted from this process. These were identified as "software is motivational and educational" and "software wastes students' and teacher's time." Teachers' ratings of these factors can be found on Table 4.

Pearson's correlation coefficients were calculated to determine if relationships existed between the teachers' perceived value of specific software and the extent students used that software. These correlations are shown on Table 5.

Table 5. Correlations of Teachers' Perceived Value of Specific Software With the Extent Students Use the Specified Software

Factor/type of software	n^a	r	Prob. of significance
Software is motivational and educational			
Spreadsheets	90	0.29**	>0.01
Drill and practice	115	0.13	0.09
Educational games	130	0.13	0.07
Decision aids	119	0.12	0.09
Telecommunications	47	0.20	0.09
Software wastes students' and teachers' time			
Spreadsheets	90	-0.21*	0.02
Drill and practice	115	-0.23**	>0.01
Educational games	130	-0.03	0.39
Decision aids	119	-0.10	0.15
Telecommunications	47	-0.17	0.13

*Significant at 0.05 level.
**Significant at 0.01 level.

RESULTS

Students most frequently used word processing programs. In 53.9 percent of the departments where teachers responded, students used this type of program. Educational games ranked second. In 52.0 percent of the departments students used educational games. This was followed by decision aid programs (47.3 percent) and drill and practice programs (46.1 percent). Used the least were telecommunications (used in 19.1 percent of programs) and programming (12.5 percent).

The topic area where students most often used computers was livestock production. In 61.3 percent of the programs, students were using computers in this area. This was followed by agricultural mechanics (57.4 percent) and crop production (55.1 percent). Students used computers least in forestry (24.2 percent). It should be noted that livestock production and agricultural mechanics were taught in more departments that was forestry.

Considering the programs where computers were used and specified topics were taught, the most extensive specific use in schools was spreadsheet programs in livestock production. The mean of 2.82 fell between seldom (2) and moderate use (3). This was followed by decision aid programs used in livestock production (2.74), decision aid programs used in crop production (2.63), drill and practice programs used in horticulture (2.43), drill and practice programs used in livestock production (2.33), telecommunications used in livestock production (2.30), and telecommunications used in crop production (2.30). Educational games used in livestock production were the most frequently used programs, being used in 41.8 percent of the schools.

Two factors were considered in assessing the perceived value of five selected types of computer programs. These factors were (a) the type of program is motivational and educational and (b) the type of program wastes students' and teachers' time. The teachers responding rated educational games as the highest in terms of being motivational and educational. The mean (9.20) fell between moderately agree (9) and strongly agree (10) on a 1 to 11 point scale. This was followed by drill and practice programs (8.56) and decision aid programs (8.25). Teachers also rated educational games favorably by disagreeing with the factor educational games are a waste of time. The mean for this factor (3.99) was closest to mildly disagree (4). Telecommunications was rated least favorably by the teachers.

Few significant correlations were found between the teachers' perceptions of the value of software programs and the amount of time students used these programs. Those correlations that did exist showed little or no relationship. The strongest correlation was between the students' use of spreadsheet programs and the factor "spreadsheet programs are motivational and educational" (r=0.29).

CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

The following conclusions, recommendations, and implications were derived from the results:

1. Computer programs most often used were word processing, educational games, decision aid programs, and drill and practice programs. The use of decision aid programs along with spreadsheets and data bases should be increased to teach problem solving with computers. Telecommunication programs should be used more to prepare students for future methods of information exchange.
2. Computers were being used more in agricultural production areas then in other agricultural subject areas. However, agricultural production was taught in more schools than were other subject areas. In a time when few graduates are returning to farming, consideration should be given to increasing the use of computer in other agricultural subject areas. The researchers encourage the development of good computer programs and lesson plans to use computers in all agricultural subject areas.
3. Teachers rated educational games the highest for being motivational and educational. Teachers who owned computers for more years than other teacher, however, did not rate this type of program as high. It seems that, as one owns a computer longer, that person sees less value in the use of computer games. The implication is that although

educational games are motivational, they should be used cautiously and not be overused. Teachers must determine whether computer games are indeed educational or simply entertaining.

4. Teachers were positive about the value of the use of the five selected types of software and agreed that these computer programs were educational and motivational. They were less positive about spreadsheets and telecommunications. The researchers suggest an increase in teachers' knowledge and use of these computer programs. Computer applications should be incorporated with in-service classes to provide training and experience for these computer programs.
5. The lack of relationships between the perceived value of software and the amount of time software is used implies that teachers do not necessarily use programs they perceive to be motivational and educational. Perhaps they use what they can most easily include in their lesson plan as opposed to what is most appropriate to the lesson. Teachers must evaluate software and the educational use of that software as it relates to the objectives of the lesson being taught. Decisions to use software should be based on the educational benefits of the software.

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THE USE OF COMPUTER SOFTWARE PROGRAMS IN SPECIFIC AGRICULTURE TOPICS

A Critique

Paul R. Vaughn, Texas Tech University--Discussant

Strong Points Of The Paper/Study

The paper was well written. Objectives were clearly stated and easy to understand. The authors are to be commended on a number of procedures, including the following:

- Pilot testing the instrument
- Testing the instrument for adequate reliability
- Using people from other universities to check content validity of the instrument
- Using a national target population
- Using a sample size recommended by statistical experts
- Using follow-up procedures
- Conducting a follow-up telephone survey

The authors have made a significant contribution to the field in an area of interest and need. Their conclusions and recommendations identify potential concerns and issues in the area of computer software use. In brief, it was a well designed study which has enhanced the knowledge base within the profession.

Questions About The Study

The required brevity of the paper probably accounts for most of the following questions. However, in analyzing the paper and the conclusions, I think the following should be answered:

- Would a test-retest measure of reliability be a more accurate measure of reliability than Cronbach's Alpha for an instrument of this type?

- Are the respondents truly representative of the population? How was the telephone survey of nonrespondents conducted? How many people were involved? How were they selected? How did they differ from respondents? (The statement "...not to differ from respondents in the areas their students used computers" is confusing.) In what areas did they differ? How was the analysis conducted?

- Is the correlation analysis between perceived value and student use appropriate? Student use is affected by a number of factors, including availability of software. If students do not have access to a software program, obviously no relationship can exist between use of that program and its perceived value.

- Are the conclusions based upon the findings of the study? For example, is the statement "the use of decision aid programs along with spreadsheets and data bases should be increased to teach problem solving with computers" a justifiable conclusion? On what finding is that conclusion based?

PERCEIVED MICROCOMPUTER EDUCATION NEEDS OF INTERNATIONAL STUDENTS ENROLLED IN THE WEST VIRGINIA UNIVERSITY COLLEGE OF AGRICULTURE AND FORESTRY

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INTRODUCTION

The Board of Science and Technology for International Development (1986) stated:

> . . . the microcomputer represents the first significant technological advance that a developing country can assimilate and exploit with a relatively low capital investment and without prior knowledge or involvement in other technologies. Unfortunately this new technology represents not only an opportunity if properly exploited but a threat if ignored. The widespread and increasing incorporation of microcomputers into all aspects of the developed countries represents a major technological advance and an inevitable social change. If a developing country fails to take advantage of the opportunity that microcomputer technology represents, its level of development in relation to developed countries will be significantly lowered. (iii)

United States' agriculture is the most technologically advanced in the world (Rasmussen, et al., 1985). It is for this reason that agricultural students and professionals from around the world come to colleges and universities of the United States to study agriculture. The West Virginia University College of Agriculture and Forestry has a long history of international student enrollment. With the increasing importance that microcomputers play in all areas of agriculture and forestry management today, it is important that the West Virginia University agriculture and forestry curricula evolve to meet the educational and professional needs of international students.

OBJECTIVES OF THE STUDY

The specific objectives of this study were:

1. to determine the perceived level of microcomputer competencies possessed by international students in the College of Agriculture and Forestry.
2. to determine the importance of microcomputer competencies as perceived by international students in the College of Agriculture and Forestry.
3. to identify the microcomputing education needs of international students in the College of Agriculture and Forestry.
4. to determine if differences in educational needs exist relative to the demographics of country of citizenship, age, gender, length of enrollment in West Virginia University, and major field of study.

METHODOLOGY

Descriptive survey research, in the form of a census study, was used to obtain data for this study. The investigator developed a list of microcomputer skills modeled after a questionnaire administered at The Ohio State University by Sherman (1986). This list, presented in the form of a questionnaire, was then reviewed and verified by a panel of experts consisting of faculty members of the College of Agriculture and Forestry to determine its content validity. A four point rating scale of 3 = high, 2 = medium, 1 = low, and 0 = not able or not important was used to determine students' perceived ability and importance levels for each microcomputer skill. The internal consistency of the questionnaire was determined through a pilot test using Cronbach's Alpha, which resulted in a coefficient of $r = .95$ for both the ability and importance sections of the questionnaire. The investigator and committee chairperson grouped the microcomputer skills into five categories to help identify areas of educational needs (Table 1). The five categories were: general, word processing, data base, spreadsheets/statistics, and "other". The "other" skill category consisted of communication, programming and presentation skills.

Competency needs, or "knowledge discrepancies", were determined using a model for needs assessment developed by Borich (1980). To prioritize international students' computing education needs, Borich's Priority Needs Index [$PNI = (I-A) \times \bar{I}$] was used to determine the magnitude of discrepancies between students' perceptions of the importance of the microcomputer skills and their abilities to perform the skills.

The **importance score** (I) for each item was defined as the student's perceptions of the importance of personally being able to use a microcomputer to perform a specific skill or job task.

The **ability score** (A) for each item was defined as the student's perceptions of his/her personal ability to use a microcomputer to perform a specific skill or job task.

The student computing education **need** (PNI) for each item was defined as the discrepancy between the importance score and the ability score multiplied by the mean importance score (Sherman, 1986).

The instrument also contained questions designed to gather background information from respondents. This information included demographic, educational and microcomputing characteristics.

POPULATION

The population for this study consisted of all (N=63) international students enrolled in the College of Agriculture and Forestry at West Virginia University for the Fall semester, 1989.

DATA COLLECTION PROCEDURES

An initial and follow up mailing resulted in the return of 52 usable questionnaires (82.5% response rate). Early respondents were compared to late respondents to determine if nonresponse was a threat to the external validity of the study. A t-test analysis of early and late respondents' answers found no significant differences ($p < .05$) between these groups. Therefore, the assumption was made that results of the study would be representative of the entire population (Smith & Miller, 1983).

RESULTS

BACKGROUND INFORMATION

One of the purposes of this study, although not explicitly stated in its objectives, was to gather background information from the students. It was hoped that this information would be useful to consumers of the research so they may more effectively address the microcomputer education needs of present and future international students enrolled in the West Virginia University College of Agriculture and Forestry.

Over 60% of the students responding had completed at least a baccalaureate degree before coming to school in the United States. It is interesting to note that while nearly 70% of the students had completed a baccalaureate degree before coming to West Virginia University, only 40% had previous computer experience, and less than 20% had received this experience via their high school and undergraduate educations. It was also reported that less than 30% of the students had previous experience using microcomputers. These figures indicate that the majority of international students had no previous microcomputer experience, and that microcomputer literacy should not be assumed solely on the basis of completion of a baccalaureate degree or enrollment in a graduate program.

Over 70% of the respondents stated they had received no microcomputer instruction at West Virginia University, or that the instruction had been inadequate. The two most common concerns related to microcomputer use expressed by students were lack of facilities and limited operating hours of microcomputer laboratories.

Students perceived lack of equipment on which to practice as the second most common barrier to learning more about microcomputers. Lack of time was the most frequently cited barrier. A lack of interest in microcomputer courses offered and a lack of importance in their studies were reported by over 25% of the students as learning barriers. Interestingly, only two students reported a lack of interest in microcomputers as a barrier to learning more about microcomputers.

Students were equally divided according to their perceived microcomputer abilities, with 50% reporting to have an intermediate or advanced level of ability, while 50% reported being beginners or non-users. Nearly an equal number of students (approximately 60%) indicated they were returning to their country after completing their studies as those who said they would have access to microcomputers in their country if they returned. This indicates that while half of the international students perceive themselves as lacking microcomputer skills, there is the potential for the majority of students to use microcomputer competencies acquired at West Virginia University in their home countries.

OBJECTIVE ONE

The first objective of this study was to investigate perceived competency (or ability) levels of students to perform specific microcomputer skills. The mean ability score recorded for each skill was below the medium ability level (scale of 3=high, 2=medium, 1=low, and 0=not able), and over half of the skills were rated below the low level of ability (Table 1). Skills receiving the highest ability scores were those that would be used most frequently with normal microcomputer use [i.e., use a printer (x=1.95) and keyboard (x=1.71), set up and put the microcomputer into operation

($\bar{x}$=1.74), use a word processing program ($\bar{x}$=1.69), and copy a disk ($\bar{x}$=1.69)]. Skills receiving the lowest ability scores were those associated with communication, evaluation and programming activities [i.e., hook up the microcomputer to communicate with other computers ($\bar{x}$=.43), evaluate software ($\bar{x}$=.43) and hardware ($\bar{x}$=.38) in your discipline, and use a programming language to create software ($\bar{x}$=.41)].

OBJECTIVE TWO

The second objective of this study was to investigate how important students perceived certain microcomputer competencies to be. Students perceived the importance of being able to perform each microcomputer skill as greater than their ability to perform the skill. A majority of the skills had a perceived importance score higher than the medium importance level (scale of 3=high, 2=medium, 1=low, 0=not important). In general, students reported the highest ability scores for those skills which they perceived as most important, and reported the lowest ability scores for those skills which they perceived as least important (Table 1). Skills receiving the highest importance scores were: load programs into the computer ($\bar{x}$=2.76), use the computer keyboard ($\bar{x}$=2.74), use a word processing program ($\bar{x}$=2.74), create graphs, charts and diagrams ($\bar{x}$=2.74), and set up and put the microcomputer into operation ($\bar{x}$=2.69). Those skills which students rated least important were: generate directories of telephone numbers, etc. ($\bar{x}$=1.62), assist in personal tasks and scheduling ($\bar{x}$=1.64), generate mailing labels ($\bar{x}$=1.74), and analyze writing through word counts ($\bar{x}$=1.76).

OBJECTIVE THREE

A Priority Needs Index (PNI) was used to investigate the third objective of the study, which was to determine microcomputer education needs of students. It should be noted that this measurement is not an indicator of perceived ability or importance levels that respondents had for a skill, but rather a weighted value indicator of the education needed to realize discrepancies between students' perceived abilities and importance of the skills. For example, of the ten skills reported as having the highest importance to students, only two were included in the ten skills receiving the highest mean PNI scores (Table 1). Conversely, of the ten skills reported as having the lowest ability by students, only three were included in the skills receiving the ten highest PNI scores. This indicates that while a student (or group of students) may have a low ability level or a high importance level for a particular skill, it is not necessarily the standard by which education needs should be determined. Microcomputer skills having the greatest education need were: perform advanced statistical analyses (PNI=4.56); transfer and receive files from other computers (PNI=4.44); use a statistical analysis program (PNI=4.37); and create bibliographies . . . (PNI=4.20). Skills having the least education need were: generate directories of telephone numbers, names, ages, etc. (PNI=1.30); assist in personal tasks and scheduling (PNI=1.51); use a printer (PNI=1.56); and create, edit and produce a short document such as a memo or letter (PNI=1.67).

Table 1

Ability, Importance and PNI Scores for Microcomputer Skills by Skill Category

Statement	PNI by Category		Ability Score		Importance Score		PNI by Skill	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
General	2.38	1.99						
Evaluate hardware in your discipline			0.38	0.66	1.86	1.10	2.94	2.06
Load programs into the computer			1.62	1.13	2.76	0.58	2.92	3.01
Evaluate software in your discipline			0.43	0.67	1.88	1.06	2.80	2.04
Format a disk			1.52	1.17	2.67	0.65	2.77	2.94
Locate free microcomputer software			0.67	0.95	2.02	1.02	2.72	2.63
Use the computer keyboard			1.71	1.02	2.74	0.54	2.53	2.89
Set up and put the microcomputer into operation			1.74	1.13	2.69	0.60	2.48	3.36
Transfer files from one disk to another			1.41	1.17	2.45	0.74	2.26	2.74
Locate information about microcomputers			0.79	0.95	1.93	1.05	2.20	2.22
Copy a disk			1.69	1.18	2.55	0.71	1.96	2.61
Use a printer			1.95	1.08	2.62	0.66	1.56	2.95
Assist in my personal tasks and scheduling (e.g., calender, to do list)			0.69	0.84	1.64	1.01	1.51	2.15
Word processing	2.78	2.07						
Create bibliographies which can be easily up-dated or automatically converted to different style formats			0.81	0.89	2.48	0.77	4.20	2.76
Create and edit a long document such as a report or manuscript			1.38	1.08	2.57	0.80	3.26	2.79
Create and edit a technical or scientific document			1.12	1.04	2.45	0.86	3.22	2.57
Generate outlines which can be quickly collapsed or expanded for use in such things as speeches or presentations			0.69	0.98	2.21	1.03	3.10	2.45
Integrate data into a personalized letter (e.g., reports, lab assignments, etc.)			1.14	0.95	2.38	0.62	2.98	2.30
Check documents for typographical, spelling, and minor grammatical errors			1.55	1.15	2.60	0.70	2.90	2.99
Use a word processing program			1.69	1.20	2.74	0.63	2.85	2.87
Create and edit instructional materials (e.g. course syllabus, texts, etc.)			1.24	1.08	2.33	1.00	2.56	3.27
Collect and retrieve notes			1.43	1.06	2.43	0.77	2.38	2.73
Create form letters which can be personalized and merged with a mailing list			0.64	0.79	1.81	0.89	2.10	2.17
Analyze writing through word counts, sentence lengths, etc.			0.62	0.80	1.76	1.08	2.04	2.09
Create, edit, and produce a short document such as a memo or letter			1.67	1.12	2.41	0.73	1.67	2.64

Table 1 (continued)

Ability, Importance and PNI Scores for Microcomputer Skills by Skill Category

Statement	PNI by Category		Ability Score		Importance Score		PNI by Skill	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Spreadsheet/Statistics	3.55	2.09						
Perform advanced statistical analyses			0.69	0.90	2.50	0.83	4.56	2.77
Use a statistical analysis program			0.95	0.99	2.62	0.76	4.37	2.95
Create graphs, charts and diagrams			1.07	1.02	2.74	0.67	4.30	2.91
Develop budgets for projects or lab assignments so as to explore "what if" alternatives			0.50	0.77	2.00	1.04	3.22	2.30
Use a spreadsheet program			1.10	1.03	2.41	0.91	3.12	2.65
Perform mathematical calculations			0.88	0.99	2.21	1.00	2.90	2.56
Perform financial analyses			0.55	0.74	1.81	1.19	2.40	2.14
Data base	2.58	1.78						
Search computer databases related to my field			0.67	0.87	2.36	0.88	4.17	2.43
Use a data management program			1.02	0.90	2.45	0.83	3.46	2.55
Generate mailing lists			0.83	0.91	1.91	0.85	1.95	2.30
Generate mailing labels			0.67	0.82	1.74	0.89	1.85	2.08
Generate directories of telephone numbers, names, ages, etc.			0.91	0.96	1.62	1.10	1.30	2.00
Other	3.38	2.07						
Transfer and receive files from other computers			0.60	0.91	2.43	0.83	4.44	2.62
Create overheads to use in instructional or professional presentations			0.93	1.05	2.50	0.83	3.61	2.90
Hook up the microcomputer to communicate with other computers			0.43	0.80	2.12	0.94	3.55	2.37
Use a programming language to create software			0.41	0.89	2.02	1.05	3.34	2.36
Use computer assisted instructional programs			1.21	0.98	2.19	0.92	1.98	2.58

Ability and Importance Score Rating Scale:
3 = High
2 = Medium
1 = Low
0 = Not Able
0 = Not Important

PNI (Priority Needs Index) Formula:
(Importance Score - Ability Score) * Mean Importance Score = PNI

OBJECTIVE FOUR

The fourth objective of the study was to determine if differences in educational needs existed relative to the demographic characteristics of gender, country of origin, current field of study, age, and length of enrollment in West Virginia University.

Males perceived a higher education need than females for all five microcomputer skill categories. It should be noted that differences in education need between males and females were the smallest found among any of the characteristics investigated in this study.

Respondents from Africa and East Asia indicated the greatest education need, while those from the Middle East and Central Asia had the lowest education need. In fact, African students had nearly twice the education need as students from the Middle East and Central Asia. All five geographic regions reported the highest education need for the spreadsheets/statistics and "other" (communication, programming and presentation) skill categories.

It was found that respondents in the Division of Plant and Soil Sciences had nearly triple the education need than those in the Division of Family Resources. The Divisions of Plant and Soil Science and Animal and Veterinary Sciences reported the greatest education need for all five of the microcomputer skill categories. All Divisions reported the spreadsheets/statistics category as having the most education need, while the general skill category was shown to have the least education need.

This study found that as age increased, microcomputer education need generally increased. Respondents of the > 37 years age group reported the highest education need for every skill category. Findings indicate that older students, especially those 32 years of age and older, have substantially greater education needs than younger students.

It was also found that as length of enrollment in West Virginia University increased, microcomputer education need decreased. Students enrolled for three years or less had over twice the education need of students enrolled for over three years.

CONCLUSIONS

The following conclusions are based on interpretations of data presented in this study. Most international students in the College of Agriculture and Forestry have no microcomputer experience prior to enrolling in the College. While most students use microcomputers, a majority have received little or no microcomputer instruction at West Virginia University. Lack of time, lack of microcomputer facilities, and limited operating hours at available facilities are factors prohibiting increased knowledge and utilization of microcomputers.

Half of the international students in the College are beginners or non-users of microcomputers. Most students plan to return to their country after completing their studies, and an equal number will have access to microcomputers in their countries if they return. Importance of being able to perform the microcomputer skills is rated higher by students than their abilities to perform those skills. Consequently, there is an educational need for every microcomputer skill investigated. The greatest education needs exist for the spreadsheets/statistics and "other" (communication, programming, and presentation) skill categories.

While males have higher microcomputer education needs than females, differences between their education needs are not as great as those found between other demographic characteristics. Students from Africa and East Asia have the greatest education needs, and students from all five geographic regions have the highest education need for the spreadsheets/statistics and "other" (communication, programming, and presentation) skill categories.

Students in the Divisions of Plant and Soil Sciences and Animal and Veterinary Sciences have the greatest education needs among Divisions of the College. Students in all Divisions have the greatest education need for spreadsheets/statistics skills. Older student have substantially greater microcomputer education needs than younger students.

RECOMMENDATIONS

The following recommendations are based on the results of this study.

1. The microcomputer competencies of international students enrolling in the College should be discerned as early as possible, either by requesting the necessary information during the application process, or immediately after enrollment in the University. Instruction should be provided to students having no previous microcomputer experience either through an orientation program before classes begin, or incorporation into the first semester of classes.
2. Each Division should advise international students of locations and operating hours of microcomputer facilities within the College, and should investigate the feasibility of expanding facilities and/or extending hours of operation.
3. Educational and instructional activities should be expanded or intensified in all areas of microcomputer application, with an emphasis placed on spreadsheets, statistics, communication, programming and presentation skills.
4. Efforts within College Divisions to address microcomputer education needs should consider differences in education need found within the demographic characteristics of geographic region, age, length of enrollment, and division of enrollment of the students.
5. Replications of this study utilize an expanded scale (0 to 5, or 0 to 7) to measure levels of importance and ability, thereby increasing the variability among education needs (PNI) scores.
6. This study should be replicated as a longitudinal trend study to determine if microcomputer education needs of international students are effectively being addressed.
7. This study should be replicated with United States students in the College to discern if education needs differ between international and national students.

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PERCEIVED MICROCOMPUTER EDUCATION NEEDS OF INTERNATIONAL STUDENTS ENROLLED IN THE WEST VIRGINIA UNIVERSITY COLLEGE OF AGRICULTURE AND FORESTRY

A Critique

Paul R. Vaughn, Texas Tech University--Discussant

Strong Points Of The Paper/Study

The authors, in the brief space allotted them, clearly identified the need for the study. The objectives were well written and easy to understand. The methodology described in the paper appears to be appropriate as the authors followed procedures that have been widely accepted (and used) within the profession. The authors are to be commended for a number of procedures they used in the conduct of the study, including the following:

- Testing the instrument used in the study for reliability
- Having the instrument reviewed for content validity
- Developing a need score using Borich's Priority Needs Index
- Conducting a census
- Using follow-up procedures (in this case, a follow-up mailing)
- Conducting an analysis of early vs. late respondents, even though a generally acceptable response rate of over 80% was observed

The results of the study were written in a clear, succinct manner. The procedures were well done and lend credibility to the findings of the study. Conclusions and recommendations were also well written and pertain directly to the findings. In brief, the study was well conducted, well written and has made a significant contribution. The findings should be very useful to the College of Agriculture and Forestry at West Virginia University.

Questions About The Study

The procedures used by the authors are excellent ones to replicate. However, before one conducts a "mirror image" of the study, the following issues should be addressed:

- Can people who lack proficiency in an area accurately assess the importance of a particular skill in that area? Can people who know nothing about computers adequately address the importance of various computers skills? In this study, the skill which obviously is the most important (or at least must developed first) is to "set up and put the microcomputer into operation." Yet, 3 other skills, which could not be accomplished without mastering this skill first, were rated higher.

- Was the analysis based on demographic characteristics appropriate? Meaningful? The small N (approximately 50), combined with the number of groups (5 geographic regions, in one instance), indicates potential problems. One unanswered question is what were the actual analysis procedures used on the demographic data.

- Should the conclusions be written to indicate that the findings were perceptions? For example, instead of saying that males have higher microcomputer education needs, should it be written that males perceive themselves to have higher microcomputer education needs than females?

MOTIVATION AND COGNITION: DO THEY WORK TOGETHER TO AFFECT STUDENT PERFORMANCE?

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INTRODUCTION

Researchers have examined the individual interaction of motivational and cognitive variables in student learning and achievement. Little research, though, has dealt with how these variables interact to affect student performance in the classroom. In the past few years a few cognitive models (that deal with motivation-cognition) have emerged and have led researchers to draw correlations between motivation and cognition to obtain a better description of student learning (McKeachie, Pintrich, Lin, and Smith, 1986; Young, 1988).

In 1987, Pintrich found that motivation and cognition do not work as separate entities, but rather together in forming five general types or clusters of students. These cluster groups were formulated by looking at student performance in the class, their motivational characteristics, and their use of self regulation (cognitive and metacognitive) strategies. The first cluster group consisted of students who scored high in class performance (A in course), had high motivation, and were high in using their self-regulation variables. The second cluster group was at the other end of the spectrum. These students were low in motivation, did not self regulate well, and received a D or E for their class performance score. The other three groups received similar class grades (B or C) but they differed greatly in their motivational and cognitive styles. The third group showed weak abilities in cognitive and self regulation styles but exhibited very high motivation towards the class. The fourth group used appropriate cognitive and metacognitive styles but felt that the course was worthless or not interesting. The fifth group also used appropriate self-regulating styles and felt that the course was important, but they did not feel confident in their abilities to do the work.

This cluster study plus others (Pintrich, 1986; Pintrich, 1988) work together in helping to negate the notion that motivation and cognition variables do not work together to affect a students' performance in the classroom. These studies imply that even though the student may have a grasp on his or her metacognitive and cognitive strategies, the role which these skills are utilized in the classroom are affected by motivation. If the five cluster groups do exist, there are several implications for college teaching. For example, the students in cluster group three could benefit from cognitive skill training (Chance, 1986). Students in cluster group four could benefit greatly from changes that the instructor makes to change the nature of his or her assignments to promote interest. If the college instructors know what cluster groups exist, they could work to use appropriate learning strategies to facilitate optimal learning in their instruction area (Pintrich, 1989).

This research coincided and complemented research by Miller and Whittington (1990) in the Department of Agricultural Education at The Ohio

State University. These new models of cognition and motivation could have strong implications on the future of collegiate education and thus needed to be researched in greater detail. "The future of research on the interaction between motivation, cognition, and instruction is bright, offering excellent opportunities to clarify and refine the relationships between motivation, learning strategies and student learning" (Pintrich, 1987).

PURPOSE AND OBJECTIVES

The purpose of this study was to investigate motivation and cognition in relationship to student performance. Specific objectives were:

1.) to determine the motivation orientation, metacognitive, cognitive, and resource management strategies of the students in the College of Agriculture at The Ohio State University, and 2.) to determine how motivation and cognition correlate in determining student performance in the classroom.

The following definitions should assist the reader in understanding the results of the study: Cognition - the mental process by which knowledge is acquired; Metacognition - the students' awareness of and knowledge about cognition as well as their control and self-regulation of cognition; Task Value - the students' interest in the task as well as their belief about how important a task is for them; Intrinsic Motivation - the students' beliefs about the importance of doing a task for challenge or mastery reasons; Extrinsic Motivation - the students' beliefs about the importance of doing a task for grades or rewards.

PROCEDURES

To obtain the data for this study, the Motivated Strategies for Learning Questionnaire (MSLQ) developed at The University of Michigan was utilized. The MSLQ is a self-reported instrument that asks students to rate themselves on various motivational and cognitive issues. This instrument has been proven to demonstrate reasonable internal reliability (McKeachie, Pintrich, & Lin, 1985). The MSLQ consists of 55 motivational questions and 55 cognitive items and the rating scale used is a 7-point Likert scale, with 1 being "not at all true of me" and 7 being "very true of me".

The MSLQ was utilized in four introductory agriculture classes at The Ohio State University during Spring Quarter, 1989. The four classes participating in this study were the introductory courses in Agricultural Economics, Dairy Science, Food Science and Nutrition, and Horticulture. The class sizes ranged from 21 to 44 students with a total of 127 students participating. All information obtained from the MSLQ was kept confidential through the use of codes. Data were collected on the actual achievement of students in the classes. Academic achievement in this study consisted of the final grade determined by midterm exams, final exam, lab assignments, and papers. The data were then analyzed using correlational and cluster designs.

RESULTS

COMPONENT RESULTS

The controlling strategies of the students in the four classes were identified using descriptive statistics (see Table 1). In the area of Motivation, the students felt that the value component was their strongest attribute, with a mean rating of 5.42 on the 7-point Likert scale. This value component consists of the students' interest and importance in the subject area. The motivational components of expectancy (internal reasons for success or failure) and affective (cognitive interference and emotionality scales) also were above a normal distribution mean of 3.5 (4.90 and 3.95 respectively).

In the area of Cognition, the students felt that original thinking was strong, with a mean of 4.93. The strategies of rehearsal and surface processing followed closely, each with a mean of 4.91. The strategies of organization, elaboration, and metacognition were rated above the normal mean, with mean values of 4.77, 4.77, and 4.65, respectively. The strategies of critical thinking and selection were the lowest with means of 4.44 and 4.0. It should be noted, however, that all these cognitive components were well above a normal distribution mean of 3.5.

In the area of Resource Management, the students scored time and study management as their strongest strategy, with a mean rating of 4.94. Utilization of a proper study environment had a strong rating at 4.88. Effort management had a mean rating of 4.69 and the agriculture students rated their help seeking abilities at 3.95.

COMPONENT CORRELATIONAL ANALYSIS

Through correlational analysis, the researchers were able to examine how each individual component of Motivation, Cognition, and Resource Management relate to one another. The correlation coefficients that were obtained form the analysis were classified using the Davis interpretation (Davis, 1971).

When responses were grouped into the areas of Motivation, Cognition, and Resource Management, these variables do have some impact on one another. Cognition and Motivation were positively correlated at .50, indicating a substantial relationship between these two variables. Resource Management and Cognition were also substantially related to one another at .50. Finally, the Motivation and Resource Management groups were moderately related with a correlation coefficient of .33.

CLUSTER ANALYSIS

The cluster analysis portion of the study was utilized to ascertain if different cluster groups of students do exist due to relationships among motivational and cognitive components. Cluster analysis was used to examine the relationships among five components: motivation, cognition, metacognition, management, and course final grade. The analysis indicated that five cluster groups (see Table 2) do exist, and they are similar to the Pintrich cluster groups (one excellent group, one poor group, and three average performance groups). While these general groups are comparable to the

Pintrich groups, the individual entities and characteristics of the cluster groups differ from the Pintrich cluster groups.

While the top and bottom groups were similar to those found in the Pintrich study, the other three groups were somewhat mixed. Cluster group one (n=15) contained the excellent students. These students generally received an A for their class performance score, were above average on their resource management skills, and slightly above average on their metacognition strategies (see Table 3). These students, however, were slightly below average on their cognitive and motivational strategies.

Cluster group two (n=18) included one of the three average performance cluster groups. This group received a B- (2.7/4.0) for their class performance score and exhibited average motivation towards the class. However, they were the lowest cluster group in the areas of cognitive skills, metacognition, and resource management skills. Cluster group three (n=15) was classified as the poor performance students; they received a C (1.9/4.0) for their class performance score. These students were below average on their utilization of cognitive, metacognitive, and management strategies. This group also was the lowest cluster group in the area of motivation.

Cluster group four (n=38) was the second of the average performance cluster groups. This group exhibited slightly above average class performance; they received a B (3.1/4.0) for their final grade. This group also was slightly above average in areas of motivation, cognition, metacognition, and resource management. Cluster group five (n=11) was the third average performance cluster group. The students exhibited average class performance, receiving a B- (2.7/4.0) for their final grade. This group was unique as it scored the highest mean ratings in the four areas of motivation, cognition, metacognition, and resource management.

CONCLUSIONS AND/OR RECOMMENDATIONS

The results of the study shed some light on the dynamic interplay of motivation and cognition in the college classroom. Through the analysis it has been shown that motivation and cognition are associated with one another. The data from the component analysis will be able to be utilized by the College of Agriculture in examining how the students' perceptions of their abilities correlate with their performance and the way that instructors teach their class. These data also can, and need to, be utilized in further studies in examining how educators can adjust their classroom to fit and complement the needs of our students.

The cluster analysis portion of this study has helped shed a little more light on this dynamic interplay between motivation and cognition and its affect on student performance. For example, cluster group 2 (average students) reported having the lowest cognitive, metacognitive, and resource management skills. Probably due to their motivation, they were able to obtain an average class performance score. In contrast, group 3, the poor students, were higher in the cognitive, metacognitive, and management strategies areas than their counterparts in cluster 2 but still received a lower performance score. This could be strongly tied to their low motivation. Students in cluster group 3 could benefit from the teacher utilizing different intrinsic and extrinsic motivation techniques to create a larger felt need for the class material for the students.

It should be noted that Pass/Non-Pass students were included in this study. Since no grade was reported for the students, the median score of 2.5 was utilized for their class performance score. This could explain why cluster group 5 exhibited the highest mean ratings in the areas of motivation, cognition, metacognition, and resource management, whereas they received an average class performance score (2.7/4.0). In further studies these Pass/Non-Pass students should be excluded from this type of cluster study.

Further research is needed to continue to look at all the variables in this complex cluster analysis. While these cluster group characteristics do not match Pintrich's exactly, it should be noted that the general make-up of the five groups coincide. The variability between the two studies could be attributed to the relatively small sample group of this study. In further studies the sample group should be increased.

The implications from this study are bright when thinking about the future of education. This study could have an impact on teachers' awareness of the factors which affect a students' performance within the classroom. In the future, if educators know how students learn best (what strategies they use) the instructor can adapt their teaching techniques and methods to improve students' retention of knowledge. With this increased knowledge about motivation, cognition, and resource management, optimal learning could be on the horizon.

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TABLE 1
MEAN SCORES ON MOTIVATION COMPONENTS, COGNITIVE STRATEGIES AND RESOURCE MANAGEMENT (N=127)

	Mean
Motivation Components	
Value	5.42
Expectancy	4.90
Affective	3.95
Cognitive Strategies	
Original Thinking	4.93
Rehearsal	4.91
Surface Processing	4.91
Organization	4.77
Elaboration	4.77
MetaCognition	4.65
Critical Thinking	4.45
Selection	4.00
Resource Management	
Time and Study Management	4.94
Study Environment	4.88
Effort Management	4.69
Help Seeking	3.95

Scale: 1 - Not at all true of me to 7 - Very true of me

TABLE 2
COLLEGE OF AGRICULTURE CLUSTER GROUPS

Cluster 1 - Excellent Students (n=15)
Performance - highest with A grade (3.5/4.0).
Management Skills - above average.
Metacognition Strategies - slightly above average.
Motivation - below average.
Cognition Strategies - below average.

Cluster 2 - Average Students (n=18)
Performance - average class performance (2.7/4.0).
Management Skills - low.
Metacognition Strategies - low.
Motivation - average motivation.
Cognition Strategies - low.

Cluster 3 - Poor Students (n=15)
Performance - lowest of cluster groups (1.9/4.0).
- C average for class grade.
Management Skills - below average.
Metacognition Strategies - below average.
Motivation - lowest of cluster groups.
Cognition - below average.

Cluster 4 - Average Students (n=38)
Performance - slightly above average (3.1/4.0).
- second highest group in class.
- performance (B average).
Management Skills - slightly above average.
Metacognition Strategies - slightly above average.
Motivation - slightly above average.
Cognition Strategies - slightly above average.

Cluster 5 - Average Students (n=11)
Performance - average (2.7/4.0).
Management Skills - highest of all groups.
Metacognition Strategies - highest.
Motivation - high.
Cognition Strategies - highest.

TABLE 3
MEAN SCORES AND STANDARD DEVIATION BY CLUSTER GROUP FOR COMPONENTS (N=127)

Cluster Groups	Motivation Mean (S.D.)	Cognitive Mean (S.D.)	Meta Cognition Mean (S.D.)	Management Mean (S.D.)	Final Grade Mean (S.D.)
Group 1	4.68 (0.39)	4.34 (0.39)	4.74 (0.5)	5.22 (0.46)	3.5 (.5)
Group 2	4.80 (0.43)	4.20 (0.49)	3.65 (0.49)	3.80 (0.55)	2.7 (.5)
Group 3	4.54 (0.2)	4.33 (0.29)	4.37 (0.48)	4.38 (0.31)	1.9 (.4)
Group 4	5.22 (0.32)	4.92 (0.34)	4.83 (0.34)	4.67 (0.43)	3.1 (.7)
Group 5	5.48 (0.22)	5.67 (0.33)	5.78 (0.48)	5.50 (0.41)	2.7 (1.2)
Total	4.98 (0.46)	4.70 (0.59)	4.63 (0.73)	4.64 (0.68)	2.9 (.8)

Scale: 1 = Not at all true of me to 7 - Very true of me

MOTIVATION AND COGNITION: DO THEY WORK TOGETHER TO AFFECT STUDENT PERFORMANCE?

A Critique

Paul R. Vaughn, Texas Tech University--Discussant

Strong Points Of The Paper/Study

The researchers did an excellent job of reporting on a complex study. The paper is well written and clearly describes the procedures that were used. Procedures in the study that deserve imitation are:

- Use of a standardized instrument
- Use of educational groups outside of agricultural education
- Adaption of studies in other areas to agriculture and agricultural education
- Identification and utilization of related components and clusters instead of treating individual variables as if they were in a vacuum.
- Appropriate use of cluster analysis
- Study of a complex subject

The authors are correct in saying "the results of the study shed light on the interplay of motivation and cognition in the college classroom". It has added significantly to our knowledge base in the profession and should stimulate additional studies in related areas. This was an interesting study which was nicely designed and conducted.

Questions About The Study

As with any study, we always have questions. The following appear to be pertinent to this research report:

- What is meant by "reasonable internal reliability" for the instrument? How was it determined? Was there any measure of the validity of the instrument?

- Should the authors address the issue of reverse correlation? There appears to be an assumption in the conclusions and recommendations that low motivation accounts (at least partially) for low grades. Could the reverse be true? Could low grades be causing low motivation?

- Was the sample size large enough for meaningful results? Did it meet the recommended sample size for cluster analysis?

- The authors indicate that differences between their research and Pintrich's could be attributed to a small sample group. If sample size is a problem, is it not possible that the differences between the author's research and Pintrich's could be expanded, rather than lessened, if a larger sample size was used?

STUDENT COGNITIVE PERFORMANCE AND FACTORS ASSOCIATED WITH COGNITIVE PERFORMANCE IN COLLEGE OF AGRICULTURE COURSES

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INTRODUCTION

Rapid scientific, technological and social advances have prompted demands on educators to develop the problem solving, critical thinking and higher order thinking abilities of students. The National Commission on Excellence in Education, in its noted 1984 report entitled A Nation at Risk, recommended that efforts be made to develop these abilities in students at all levels, including the postsecondary level (pp. 25, 27).

The challenge issued by the National Commission on Excellence in Education, and others, appears to be merited in light of what is expected of an educated individual today. Harl (1980) argued that graduate should possess "the ability to think and reason - creatively, analytically, thoroughly and with reasonable alacrity" (pg. 5). Yet, McKeachie (in Joscelyn, 1988) appeared to question whether higher education is indeed reaching this goal when he noted that "everyone agrees that students learn in college, but whether they learn to think is more controversial (pg. 1).

In order to consider the manner in which problem solving, critical thinking and higher order thinking abilities of students are developed it is necessary to identify and draw upon a conceptual framework which encompasses these abilities and skills. Inasmuch as these thought processes fall within the cognitive domain, a model such as Bloom's Taxonomy of Educational Objectives for the cognitive domain is recognized as a useful guide for consideration of the cognitive aspects of teaching and learning which prompt higher order thinking by students (Bloom et al., 1956).

Research has been done which considers the impact of the teaching and learning process upon the cognitive domain of thought (Pickford, 1988; Newcomb & Trefz, 1987; Fischer & Grant, 1983; Ryan, 1973; others). Unfortunately, studies focusing upon instruction and learning at the college level, and in colleges of agriculture in particular, are extremely limited. In order to broaden the knowledge base in this area, this study considered the ability of students to perform at higher levels of cognition as identified by Bloom's Taxonomy and whether specific factors were associated with superior performance at the higher levels of cognition.

PURPOSE AND OBJECTIVES

The purpose of this study was to describe the cognitive performance of students enrolled in four selected introductory level courses in the Ohio State University College of Agriculture. The study also sought to identify course experiences, student characteristics and instructor characteristics which were associated with student performance at the higher levels of cognition. Research questions guiding the study were:

1. What was the ability of students to perform at the various levels of cognition in general, and in specific subject matter areas, upon entering selected courses?
2. What was the ability of students to perform at the various levels of cognition in general, and in specific subject matter areas, upon completion of selected courses?
3. To what extent did relationship exist between student cognitive performance and the cognitive levels of course experiences (discourse, tests & quizzes, assignments), selected student characteristics (academic ability as indicated by ACT composite score, prior experience, motivation) and instructor professional experience?

PROCEDURES

This study was descriptive in nature. The population consisted of 118 students enrolled in four introductory level courses in the Ohio State University College of Agriculture during Spring Quarter, 1989. Courses were purposefully selected to represent four disciplines in the college (animal science, plant science, food science and social science). Instructor willingness to participate in the study and knowledge of the instructor's interest in improving his/her teaching performance also served as selection criteria.

Student cognitive performance was evaluated from two perspectives. General cognitive ability was assessed at the beginning and upon completion of each course using the Developing Cognitive Abilities Test (DCAT), a standardized test for assessing cognitive performance at the lower, middle, and higher levels of cognition (Beggs, 1988). Reliability for the DCAT was assessed in this study for the three levels of cognition represented in the instrument. Kuder-Richardson 20 coefficients for these levels were .65 for basic cognitive abilities, .59 for application skills and .72 for critical thinking skills.

Cognitive performance in the subject matter areas was also considered. Pretests containing items at the various levels of cognition were developed for each course by the researchers and course instructor and administered during the first week of classes. The course final examination was used to assess cognitive performance in the subject matter area upon completion of the course. A weighted cognition score was calculated for each item on the subject matter pretests and final examinations by multiplying the percentage of possible points given the item by the instructor by a value reflecting the cognitive level of the item. Cognitive level weighting values used were those employed by Pickford (1988) in a similar study. These values were: knowledge, .10; translation, .20; interpretation, .25; application, .30; analysis, .40; synthesis, .50 and evaluation, .50. Individual student cognitive performance scores were obtained by summing the weighted cognition scores of all correct items on the examinations and dividing this value by the possible weighted cognition score of the examinations.

The cognitive level of instruction in each course considered was assessed using the Florida Taxonomy of Cognitive Behavior (FTCB) (Brown, Ober, Soar & Webb, 1968). Developed from Bloom's Taxonomy, the FTCB was used to classify instructor behaviors, statements or questions into one of seven levels of cognition represented on the instrument. Validity of the FTCB is based upon its direct derivation from Bloom's Taxonomy. Consequently, the FTCB was considered valid in light of the support generally given to Bloom's Taxonomy as a means for identifying behaviors at the various levels of cognition. Reliability of the FTCB was dependent upon the raters' utilization of the instrument. The single rater responsible for assessment of the cognitive levels of instruction and student performance in the study posted reliability coefficients of .98 and .99 in using the FTCB for two separate training observations. These observations concluded formal training in the use of the FTCB which took place prior to the start of classes involved in the study.

Three class sessions were observed at three week intervals in each of the courses to assess the cognitive levels of instructor discourse. Additionally, all tests, quizzes, assignments and final examinations in each of the courses were collected and the cognitive level of each item appearing on these documents was determined using the FTCB.

Values representing the cognitive level of instructor discourse, tests and quizzes, and assignments, were calculated for each course studied. The percentage of discourse, test and quiz items, or assignment items appearing at each level of cognition were multiplied by their respective cognitive level weighting values and summed in order to obtain single values indicative of the relative level of cognition evidenced in each course experience.

Student motivation was assessed using the Motivated Strategies for Learning Questionnaire (Pintrich, 1988). A questionnaire used by Pickford (1988) was employed to collect information concerning student previous experience while an instrument developed by Straquadine (1987) was completed by instructors to provide information about their professional experience. All questionnaires used were determined to be valid and reliable. ACT composite scores were obtained from student's academic records.

Pearson product moment correlations were calculated between student cognitive performance scores and each of the values representing the course characteristics, student characteristics and instructor characteristics considered.

RESULTS

No appreciable change took place in student's cognitive ability outside of the subject matter areas studied. Scores on the Developing Cognitive Abilities Test administered the first and final weeks of the quarter reflected negligible change. Table 1 indicates that at the beginning of the quarter students averaged 79% correct on items evaluating general cognitive abilities (Bloom's knowledge and comprehension levels), 81% correct on application skills items (Bloom's application level), and 61% correct on critical thinking skills items (Bloom's analysis and evaluation level). While average scores at the end of the quarter increased slightly, paired samples t-tests indicated no significant differences at any of the three levels represented on the DCAT.

Table 1. Student Performance on the Developing Cognitive Abilities Test

		Pretest		Posttest	
Course	Level of Cognition	mean % correct	sd	mean % correct	sd
1	general abilities	79.87	14.21	73.50	13.34
	application skills	80.44	13.23	78.14	15.21
	critical thinking	55.57	20.47	61.43	18.55
	Grand mean	71.96 n = 23		71.02 n = 14	
2	general abilities	85.90	13.96	84.00	13.35
	application skills	85.16	12.27	85.06	12.64
	critical thinking	66.84	21.26	66.39	21.27
	Grand mean	71.96 n = 19		71.02 n = 18	
3	general abilities	77.97	11.39	78.27	14.00
	application skills	80.79	12.92	78.16	17.61
	critical thinking	62.08	18.31	60.52	18.33
	Grand mean	73.61 n = 34		72.32 n = 31	
4	general abilities	79.14	15.90	81.17	13.72
	application skills	81.14	11.78	82.79	11.60
	critical thinking	63.21	17.87	64.88	17.11
	Grand mean	74.50 n = 44		76.28 n = 42	

Cognitive performance in each of the subject matter areas increased between the beginning and end of the quarter as Table 2 indicates. Mean weighted cognition scores expressed as a percentage of the maximum possible weighted cognition score of each examination showed an increase in student cognitive performance between the pretest and final examination of 26% in two classes, 32% in a third class and 37% in the fourth class studied.

Pearson product moment correlations between standardized student cognitive performance scores on the final examination and values representing the cognitive level of course experiences, student characteristics and instructor characteristics were all moderate to negligible. Moderate positive relationships appeared to exist between standardized cognitive performance scores and the cognitive levels of tests and quizzes given in the courses, ACT composite scores, and instructor experience (rho = .34, .32 & .38, respectively). Low or negligible positive relationships were indicated between student's performance and their motivation and experience (rho = .12, & .03, respectively). Low or negligible negative relationships appeared to exist between student performance and the cognitive level of instructor discourse as well as the cognitive level of assignments (rho = -.29 & -.07, respectively).

Table 2. Student Cognitive Performance On Subject Matter Tests

	Pretest		Posttest	
Course	mean % possible weighted cognition score	sd	mean % possible weighted cognition score	sd
1 (n=23)	34.26	9.25	60.21	10.72
2 (n=19)	52.03	11.97	84.19	7.26
3 (n=34)	42.05	9.91	79.52	13.15
4 (n=42)	35.89	7.62	61.90	8.88

Table 3. Correlations Between Student Cognitive Performance On The Course Final Examination and Selected Variables

Characteristic	Correlation With Students' Cognitive Achievement Score On Final Examination	
Instructor professional experience	.38	(N = 118)
Course tests and quizzes	.34	(N = 118)
Student ACT composite score	.32	(N = 99)
Cognitive level of instructor discourse	-.29	(N = 118)
Student motivation	.12	(N = 93)
Student previous experience	.03	(N = 100)
Course assignments	-.07	(N = 118)

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Major conclusions and implications drawn as a result of this study included the following:

(1) The general cognitive performance capabilities of students did not change between the beginning and completion of courses studied. This conclusion supports the contention that a single course, in itself, may have little impact upon a student's innate ability to apply, analyze, synthesize or evaluate information.

(2) The cognitive performance of students in the subject matter areas improved between the beginning and completion of the courses studied. Consequently, it appears that a single course can be effective in developing student's abilities to apply, analyze, synthesize and evaluate information dealing with specific subjects.

(3) None of the variables considered appeared to be clearly associated with student cognitive performance in the subject matter areas. Further research is needed in order to determine what factors are most influential in bringing about the observed changes in student performance.

Recommendations offered focused on teaching as well as further research. With regards to teaching, it was recommended that all instructors in the College of Agriculture be provided with opportunities to consider the role that their teaching and evaluation practices play in the cognitive development of students in their particular subject matter areas. Workshops provided by agricultural educators are one feasible means whereby this might be accomplished. It was also recommended that further research involving a larger number of courses and course instructors be done to continue the process of seeking to identify those variables associated with student cognitive performance.

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STUDENT COGNITIVE PERFORMANCE AND FACTORS ASSOCIATED WITH COGNITIVE PERFORMANCE IN COLLEGE OF AGRICULTURE COURSES

A Critique

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This was timely research with a sound design and clearly written results and conclusions. I commend Miller and Newcomb on attacking a complex domain and identifying instruments which help describe multifarious interactions. The introduction logically moved from A Nation at Risk to professional inquiry.

The purpose and objectives were clearly stated. It would be helpful if course experiences, student characteristics, and instructor characteristics were discussed as subsets. The procedures section was particularly useful as it identified seven instruments used to quantify student cognitive performance and included enough detail to encourage replication.

I was immediately concerned about low $K\text{-}R_{20}$ values describing the DCAT. However, Ary, Jacobs, and Razavieh (1985) warned "if a test has items of varying difficulty and is measuring various traits, the Kuder-Richardson estimate is expected to be lower than the split-half estimate" (p. 234). Nonetheless, our decisions hinge on the reliability of precise measures of basic cognitive abilities, applications skills, and critical thinking skills.

Bloom's Taxonomy was selected as a baseline to describe levels of cognitive performance. Why was the cognitive level subdivided into translation and interpolation? Are the six levels of the Taxonomy linear as assumed by the assigned values? What were the effects of this assumption?

I was confident internal reliability was established within the assignment of values for tests, quizzes, and assignments. However, it was not clear from the description. Why was n=23 and n=14 used for the pre-posttest in Course 1? Would it be beneficial to use only the 14 complete pre-post data sets for Course 1?

The results section was clear. The bottom line was quickly reported, "no appreciable change took place in student's cognitive ability outside of the subject matter areas studied." The authors did not find a quick answer to a complex problem; but they made a significant contribution towards a better understanding. Perhaps with more precise instruments a better understanding could be acquired. Why was a low negative relationship observed between student cognitive performance and instructor discourse? Could "peek and poke" techniques help explain the learner-teacher interaction?

I recommend this research for careful analysis and evaluation. The two recommendations offer a challenge to identify ways to increase student cognitive performance and enhance the science of teaching.

THE RELATIONSHIP BETWEEN VOCATIONAL AGRICULTURE AND A COLLEGE PREPARATORY CURRICULUM IN REGARDS TO ACADEMIC SUCCESS IN COLLEGE

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INTRODUCTION

The educational quality of high schools was a topic of concern to Americans during the 1980's. As a result, educational reform was a prominent issue in the American political and social agenda. Consequently, educational reform in the United States was heavily influenced by the federal government (Alexander & Pallas, 1984). An important source of federal influence was the report entitled "A Nation at Risk: The Imperative of Educational Reform" (National Commission on Excellence in Education, 1983). This report suggested that curriculum reform was the most pressing education reform issue and advocated a core curriculum for American high schools. Other reports (Boyer, 1983; The College Board, 1983; Goodlad, 1984) concurred with the National Commission on Excellence in Education on the need for a core curriculum. These proposed core curriculums emphasized college preparatory courses and usually omitted vocational education courses, such as vocational agriculture, from their recommendations.

The concern of the nation's universities and colleges in regards to the academic preparation of students for postsecondary education is another aspect of the core curriculum that bears implications for vocational education. During the 1980's a number of colleges and universities raised academic entrance requirements for incoming freshman. These increased requirements have usually meant a prescribed or recommended course of study in high school that usually does not include vocational education courses. McCurdy (1982) contended that it is the inability of students to do college work that prompted institutions of higher learning to tighten entrance standards.

There is agreement that certain academic competencies -- reading, writing, speaking and listening, using mathematics, reasoning and studying -- are essential for success in college. The argument follows, then, that these concepts are best acquired through enrollment in high school in English, mathematics, social science, science, foreign language, and the arts (The College Board, 1983). Research indicates that academic achievement in college is positively related to the extent to which students complete a college preparatory curriculum in high school (Easton, 1970; Melton, 1961; Mitchell, 1985), and that academic performance in high school (GPA or rank in graduating class) and scores on achievement and aptitude tests, such as the ACT, predict academic achievement in higher education (Rowan, 1978; Sanford, 1982).

Of particular concern to agricultural education are the impacts of the high priority high schools have placed on college preparatory curriculums and the changing admission requirements for higher education are having on enrollment in vocational agriculture in high schools; on enrollment of vocational agriculture students in colleges of agriculture; and upon the academic success of college students who have and have not completed a college preparatory curriculum in high school. There is evidence of a negative relationship between the number of units of vocational agriculture completed in high school and the number of college preparatory courses completed; however, there is also evidence that enrollment in vocational agriculture does not necessarily prevent students from completing a college preparatory curriculum (Newman & Warmbrod, 1986; Raven & Warmbrod, 1990).

PURPOSE AND OBJECTIVES

The purpose of this study was to investigate the relationship between the academic success of students in a college of agriculture and the extent to which they had completed a college preparatory curriculum in high school. Of particular interest was how enrollment in vocational agriculture in high school impacts upon the relationship between completion of a college preparatory curriculum and academic success in college. The following specific research questions were investigated:

1. What is the relationship between the number of units completed in high school in English, mathematics, science, social science, foreign language, and the arts and whether or not students graduate from college?

2. What is the relationship between the number of units of vocational agriculture completed in high school and the extent to which students complete a college preparatory curriculum in high school and whether or not they graduate from college?

PROCEDURES AND DATA ANALYSIS

The research design was a longitudinal panel study. Data were analyzed for four populations of new first-quarter freshmen entering the College of Agriculture at The Ohio State University during the 1981 (N=175), 1982 (N=180), 1983 (N=146), and 1984 (N=186) autumn quarters. Data regarding students' rank in high school graduating class, scores on ACT Academic Tests, and high school courses were obtained from transcripts and other official documents in the Office of Admissions. Data regarding courses completed at the university and grades earned in these courses were obtained from university transcripts. Data were analyzed using discriminant analysis and Pearson product-moment correlation coefficient. The number of cases for some of the analyses is reduced since data for all variables were not available for all cases.

For the purpose of this study, college preparatory courses were defined as the courses required by the university for "unconditional admission". The Board of Trustees implemented a new policy in the autumn quarter of 1984 requiring entering freshmen to complete a college preparatory curriculum in high school to be admitted unconditionally. The prescribed college preparatory courses required for unconditional admission include four units of English, three units of mathematics, two units of social science, two units of science, two units of foreign language, one unit of visual or performing arts, and one additional unit from any of the required subjects other than visual or performing arts. Students who do not meet these requirement are admitted as "conditional" and are required to remove the deficiencies by demonstrating competence by placement tests or by completing courses in the areas of deficiency which do not count toward graduation.

RESULTS

GRADUATION FROM COLLEGE

In 1982, the year the board of trustees announced the new admissions policy, 12% of the entering freshmen had completed the college preparatory curriculum called for in the new policy. Thirty percent of the entering freshmen in 1984, the year the new admissions policy was implemented, had completed the courses required for unconditional admission (Table 1). A higher percentage of the entering freshmen in 1981 and 1982 who met the requirements for unconditional admission had graduated or were still enrolled in good academic standing after five years than was the case for freshmen who had not completed the recommended college preparatory curriculum. Also, in 1984, the first year of the new admission criterion, there was an increase in the total percentage of new first-quarter freshmen that had graduated or were still enrolled in good academic standing after five years over the three previous years. However, a higher percentage of the entering freshmen in 1983 and 1984 who had not met the requirements for unconditional admission had graduated or were still enrolled in good academic standing after five years than freshmen who had completed the courses required for unconditional admission.

Table 1. Admission Status and Graduation from College

Factor	1981	1982	1983	1984
Total Number of Cases	175	180	146	186
Percent Graduating	70%	71%	68%	75%
Admission Status				
Unconditional	22%	11%	24%	30%
Conditional	78%	89%	76%	70%
Percent Graduating				
Unconditional Admission	90%	82%	67%	75%
Conditional Admission	73%	69%	69%	78%

Discriminant analysis was used to investigate in more detail the extent to which the number of high school courses in English, mathematics, social science, science, foreign language, visual/performing arts, and vocational agriculture discriminate between students who had graduated or were still enrolled in good academic standing five years after entry and students who had withdrawn or been dismissed from the university. In addition to units of college preparatory courses, class rank percentile and ACT composite score were included in the analysis as potential discriminating variables. The discriminant function for each class of new first quarter freshmen in the study was statistically significant ($p<.05$) indicating that graduates can be distinguished from non-graduates by the set of variables included in the analyses (Table 2).

Discriminant analysis revealed that class rank percentile was a powerful discriminating variable for all four years of data. Class rank percentile was the only discriminating variable common to all four years of data. Mathematics was a powerful discriminating variable for the freshmen populations who entered in 1981 and 1982. English, foreign language, and ACT composite score were also powerful discriminating variables for the students who entered in 1982. Additionally, foreign language was also a discriminating variable for the 1983 data while ACT composite score was also a discriminating variable for the 1984 data. The 1983 data was the only case in which vocational agriculture was a strong discriminating variable. Science was of lesser importance and units of art and social science were the least important variables in the set that discriminates between graduates and non-graduates.

The positive standardized discriminant function coefficients for class rank and units of math for 1981 indicated that higher values for these discriminating variables tend to be characteristics of graduates rather than non-graduates. This was true for the 1982 and 1983 populations except for the foreign language and vocational agriculture variables. The standardized discriminant function coefficient for these variables were negative indicating that higher values for these variables tend to be characteristics of non-graduates rather than graduates. The signs for the group centroids for the 1984 data were opposite of what they were for the 1981, 1982, and 1983 data. Therefore, the negative standardized discriminant function coefficient for the class rank variable for the 1984 data indicated that this discriminating variable tends to be a characteristic of graduates rather than non-graduates and the positive standardized discriminant function coefficient for the ACT composite score showed this variable tends to be a characteristic of non-graduates. The percent of cases correctly classified by the discriminant functions ranged from a low of 68% in 1981 and 1984 to a high of 78% in 1983. Therefore, classification based on the discriminating variables resulted in 35% to 56% fewer errors than would have been expected by random classification.

Table 2. Summary Data of Discriminant Analysis of Students Who Graduated and of Students Who did not Graduate

Variables	1981 (n=147)		1982 (n=155)		1983 (n=131)		1984 (n=163)	
	b	s	b	s	b	s	b	s
English	-.217	.008	.185	.206	.071	.010	-.038	.044
Math	.538	.747	.464	.624	.125	.301	-.192	-.138
Social Science	.089	.043	.340	.289	.005	.073	.281	.300
Science	.248	.464	-.079	.275	.168	.288	.176	.110
Foreign Language	.141	.262	-.413	-.131	-.712	-.339	.359	.202
Art	-.095	.172	-.091	-.108	-.470	.015	.317	.093
Vocational Ag	-.154	-.170	.197	.112	-.708	-.006	.352	.058
Composite ACT	-.158	.501	.483	.665	.263	.368	.696	-.006
Class Rank	.668	.765	.289	.634	.458	.351	-1.203	-.636
Group Centroids								
Not a Graduate	-.658		-.842		-.762		.663	
Graduate	.237		.313		.347		-.201	
Eigenvalue	.158		.267		.269		.135	
R_c	.370		.459		.460		.345	
Wilks' Lambda	.863		.789		.788		.881	
Significance level	<.024		<.001		<.001		<.031	
Percent Correctly Classified	68%		70%		78%		68%	

b = standardized discriminant function coefficient
s = within-groups structure coefficient
R_c = canonical correlation coefficient

ENROLLMENT IN VOCATIONAL AGRICULTURE

The data support previous research indicating negative relationships between the number of units of vocational agriculture and the number of units of college preparatory courses completed. The magnitude of the relationship was negligible to low for English (r =-.05 to -.26), social science (r =.05 to -.14), and mathematics (r =-.07 to -.28). The strength of association was low to moderate for visual/performing arts (r =-.11 to -.31) and science (r =-.28 to -.35). The negative correlation between vocational agriculture and foreign language was moderate to substantial (r = -.45 to -.52) (Table 3).

Table 3. Correlation Between Number of Units of Vocational Agriculture and Number of Units of College Preparatory Courses

	Vocational Agriculture			
Preparatory Course	1981 (N=175)	1982 (N=180)	1983 (N=146)	1984 (N=186)
English	-.06	-.06	-.26	-.07
Mathematics	-.07	-.28	-.25	-.25
Social Science	.05	.01	.02	-.14
Science	-.32	-.35	-.34	-.28
Foreign Language	-.52	-.44	-.49	-.45
Visual/Performing Arts	-.11	-.21	-.31	-.18

The negative relationships between units of vocational agriculture and college preparatory courses were corroborated by the finding that the percentage of students admitted unconditionally who had not enrolled in vocational agriculture in high school was from one and one-half to four times higher than the percentage of students admitted unconditionally who had studied vocational agriculture (Table 4). However, the percentage of former vocational agriculture students who had graduated or were still enrolled in good academic standing after five years was higher than the percentage of students who had not studied vocational agriculture in high school and had graduated or were still enrolled in good standing at Ohio State.

Table 4. Relationship of Enrollment in Vocational Agriculture to Admission Status and Graduation from College

Factor	1981 (N=175)	1982 (N=180)	1983 (N=146)	1984 (N=186)
Enrolled in Vocational Agriculture (%)	50%	51%	54%	47%
Unconditional Admission Status (%)				
When Enrolled in Vocational Agriculture	8%	6%	12%	22%
When Not Enrolled in Vocational Agriculture	36%	15%	36%	38%
Percent Graduating				
When Enrolled in Vocational Agriculture	79%	77%	72%	78%
When Not Enrolled in Vocational Agriculture	75%	63%	65%	76%

CONCLUSIONS AND/OR RECOMMENDATIONS

The evidence is inconclusive for the relationship between completing or not completing a college preparatory curriculum in high school and graduation from college. From eight to nine of each ten freshmen entering in 1981 or 1982 who would have been admitted unconditionally, if the new admissions policy had been in effect, graduated or were still enrolled after five years. In contrast, approximately seven of each ten students, who would have been admitted conditionally under the new policy, graduated or were still enrolled after five years. In comparison, the graduation rate of freshmen who were admitted conditionally in 1984, the year the new standards were implemented, was slightly higher than freshmen who were admitted unconditionally. Additionally, class rank percentile was more potent in explaining, or predicting, college graduation than was type of curriculum completed. The data generally indicates that it is not what the student takes that is important, but rather, how well the student does in what they take that is more meaningful.

Students who enroll in vocational agriculture in high school are less likely to complete a college preparatory curriculum than students who do not enroll in vocational agriculture. The substantial negative relationship between units of vocational agriculture and units of foreign language indicates that perhaps students are taking vocational agriculture in lieu of foreign language. This relationship may partially account for the lower percentage of former vocational agriculture students who were admitted unconditionally to the university compared to the percentage of students who did not take vocational agriculture in high school that were admitted unconditionally. However, students who enroll in vocational agriculture in high school are just as likely to graduate from college as students who do not enroll in vocational agriculture.

The unclear relationship between a college preparatory curriculum and graduation from college indicates further research needs to be conducted. The relationship between the academic preparation of new first-quarter freshmen and their subsequent academic success in college should be investigated for the new first-quarter freshmen entering the College of Agriculture at The Ohio State University for the years following 1984. Additionally, the relationship between a college preparatory program and a student's academic performance in terms of college grade point average should be studied.

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THE RELATIONSHIP BETWEEN VOCATIONAL AGRICULTURE AND A COLLEGE PREPARATORY CURRICULUM IN REGARDS TO ACADEMIC SUCCESS IN COLLEGE

A Critique

Glen C. Shinn, Clemson University--Discussant

Academicians have long debated the effects of curriculum. This research by Raven and Warmbrod will most likely not put the debate to rest. The research did, however, provide insight into the macrocosm of academic success and encouraged a moderate admissions dogma. The introduction quickly focused the inquiry and provided a review of the philosophy and logic of a core curriculum. This research was part of a systematic query into the facts and fantasies of a college preparatory curriculum and the effects on academic success. However, it could well be argued that success is more complex than a dichotomous variable of graduation from college. The purpose and objectives were clear and succinct. The procedures and data analysis section provided detail to allow replication of the study at any college or university.

The results section was divided into two major categories. The first, Graduation from College, contained few surprises. Class rank was a powerful variable. Mathematics, English, foreign language, and ACT composite scores helped explain academic success. I was pleased that vocational agriculture surfaced as a strong discriminating variable for the class of 1983. It was also interesting that those with conditional admission had a higher graduation rate in two of the four years studied. A technique which correctly classified 68% to 78% of the students as graduates or non-graduates should bring a sense of humility and a word of caution to the college admissions officer.

The second category, Enrollment in vocational agriculture, had pertinent findings for a profession caught up in agriscience and international agriculture. There was a moderately negative correlation between vocational agriculture and science. And there was a substantial negative correlation with foreign languages. Are our methods and attitudes counterproductive in vocational agriculture to a science and international curriculum? Perhaps we should carefully re-evaluate our philosophy and practice.

Perhaps there was a point of light; in every case the percentage of students who had graduated was higher for those students who had studied vocational agriculture.

The authors are to be commended on the investigation of an important academic question. They were conservative in their conclusions and recommendations. In fact, we need to be conservative in our admission decisions. It appears ". . . it is not what the student takes that is important, but rather, how well the student does in what they take that is more meaningful."

A PROFILE OF HIGH SCHOOL AND BEYOND EXPERIENCES OF 1983 HIGH SCHOOL GRADUATES DESCRIBED WITHIN THE HIGH SCHOOL CURRICULUM CONCENTRATION OF THE GRADUATES

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INTRODUCTION

The National Commission on Secondary Vocational Education (1984) wrote the following about the status of secondary vocational education in the nation.

> Our society is obsessively concerned with higher education as a preparation for work and downgrades the intrinsic, lifelong value of education. Our secondary schools reflect this obsession by valuing only the college bound. Such a narrow focus ignores the fact that approximately 80% of the jobs in America do not require a college degree, and most students will not obtain one.
>
> This educational myopia that pervades our society produces predictable results.
>
> Many high school graduates cannot read, write, compute, or perform well enough to find meaningful work during or following high school.
>
> Many high school graduates, holding their unmarketable degrees, face disillusionment when their professional expectations collide with reality. They are unable to recognize the intrinsic value of their education or understand its relevance to their personal goals.
>
> High school vocational education is downgraded and assigned second-class status, especially trade and industrial programs. Some of the most successful programs, such as clerical and computer studies, are reluctantly listed as such. (p. 1-2)

If the description of secondary education by The National Commission on Secondary Vocational Education is accurate, it would seem reasonable to expect high school graduates to also have a negative opinion about their high school experience, especially if these students have been in the "real world" long enough to have experienced the calamity addressed above.

An interest in the perceptions of high school graduates, grouped by vocational concentrators and general concentrators, concerning their high school experience and a need to know "what happens" to students after they leave high school formed the basis for this investigation.

PURPOSE AND OBJECTIVES

The purpose of this study was to follow-up a sample of the 1983 Idaho high school graduates to determine their perceptions of their high school experience and to describe those students' current status in terms of education and employment. The specific objectives of the study were to:

1. determine the curriculum concentration (general or vocational) selected by the graduates and develop a profile of high school courses completed and other measures of achievement within each curriculum concentration.

2. develop a profile of post-graduation and first job experiences of the graduates within each curriculum concentration.

3. develop a profile of the current education and employment status of the graduates within each concentration.

4. develop a profile of the satisfaction of the graduates with selected aspects of their high school experience within the each curriculum concentration.

PROCEDURES

This study was based on a descriptive survey. The major purpose of this study was to describe the sample on the variables identified in the objectives. Differences among the sample sub-groups were analyzed statistically in order to add information.

The target population of the study were all 1983 Idaho public high school graduates (12,130 graduates). The sample was selected using a stratified random, cluster, proportional sampling technique. Idaho high schools (121 schools) were stratified according to the state athletic classification schema for high school size. This included five divisions based on high school enrollment. From each strata, a proportional random sample of high schools were drawn (40 schools total). Class rosters of the 1983 graduates were solicited from each selected high school. Class rosters from each strata were proportionally and randomly sampled.

An initial sample of 2400 students was selected. Four of the initial 40 schools decided to not participate further when asked to provide transcripts. The remaining schools provided 2082 usable transcripts and 2112 usable student addresses. Of the 2112 questionnaires initially mailed, 787 were returned as undeliverable, primarily because the subjects had moved from the address supplied by the high school. Therefore, the sample of this study for the data from the transcripts numbered 2082 and for the data from the mailed questionnaire numbered 1381 students.

The data concerning the courses taken in high school and the data concerning high school achievement were collected from the transcripts of the subjects, copies of which were supplied by the high schools. The post high school data were collected using a mailed questionnaire. The mail questionnaire was validated by a panel of judges deemed experts in the area of follow-up studies. A field test of the questionnaire was conducted using students enrolled in post-secondary vocational programs.

Data were summarized using descriptive statistics. Analyses for differences between curriculum concentrators were conducted using the SPSSx statistical package. In all cases, the alpha level for significance was set at 0.05.

Of the 1381 subjects mailed a questionnaire, 730 responded with usable questionnaires for a response rate of 53 percent. Because no telephone numbers existed in the sample data base, a telephone follow-up to the non-respondents was not possible, however, the early and late returns were compared on selected variables and no differences were found. For this study, it has been assumed the non-response source of error has been dealt with adequately.

Vocational concentrators were designated as those students who had completed 3 or more credits in one of the following vocational areas, agriculture, consumer home economics, occupational home economics, business education, marketing education, health occupations and trade and industry, excluding general labor preparation credits. General concentrators (for the purposes of this study) were designated as those students who had not completed 3 or more credits in one of the vocational areas.

FINDINGS

OBJECTIVE 1

An analysis of the transcripts of the subjects of the study indicated the 1225 (58.8%) of the sample had completed 3 or more credits in one of the vocational areas and were therefore classified as vocational concentrators, whereas, 857 (41.2%) were classified as general curriculum concentrators.

The general concentrators completed significantly more credits in mathematics, science, English, social studies and humanities/fine arts (Table 1). The vocational concentrators completed significantly more vocational credits than the general concentrators with mean credits being 10.8 and 4.8.

Place Table 1 about here.

The general concentrators had a significantly higher high school GPA (mean = 2.80) and class rank (mean percentile = 0.45) than did the vocational concentrators (mean GPA = 2.72, mean percentile = 0.51).

The ACT was taken by 399 general concentrators and 482 vocational concentrators. Significant differences between the two groups existed in the math, science, English, social studies and the composite scores with the general concentrators scoring higher on each test. The general concentrators had an average score in the composite of 20.34, while the vocational concentrators had an average score of 17.42.

OBJECTIVE 2

While the general concentrators continued their education during the fall after graduation at the rate of 60.2%, 40% of the vocational concentrators did likewise. Over 12% general concentrators and 13.2% of the vocational concentrators chose other than education or employment the fall following graduation.

Vocational concentrators used employment and placement agencies and relatives in finding their first job more so than did general concentrators. Direct contact with an employer in finding their first job was cited by both groups at rates of 29.4% and 38.3% respectively.

General concentrators cited school reasons most often for leaving their first job; they also indicated that 17.9% still had their first job. Vocational concentrators most often cited a promotion as the reason for leaving their first job.

OBJECTIVE 3

Vocational concentrators and general concentrators indicated they had completed high school only (no additional education) at the rate of 32.0% and 17.9% respectively. Vocational concentrators graduated from a post-secondary vocational technical school at a rate of 15.2%, attended college but did not graduate at almost the same rate as the general concentrators, but their graduation from college rate was much less than the general concentrators, 18.2% and 37.6% respectively.

While the vocational concentrators reported a slightly higher current employment rate (73.4% vs 71.8%) and the general concentrators reported a higher rate as students (16.3% vs 7.6%), perhaps the most noticeable difference was that 11.9% of the general concentrators and 19.0% of the vocational concentrators reported themselves as being neither employed or as a student.

The vocational concentrators reported a slightly higher rate of having major problems finding a job (17.8%) than the general concentrators (15.6%). While both groups cited lack of experience about equally (14%), the vocational concentrators cited a lack of education at a higher rate than did the general concentrators (15.4% vs 13.5%).

OBJECTIVE 4

The subjects of this study had graduated from their respective high schools in 1983 and at the time of the data collection (late summer and early fall, 1989) had been out of high school for five years.

The subjects of the study were asked to identify the curriculum type (general education, college preparation and vocational education) that would best describe the courses they had chosen for high school. General concentrators indicated the curriculums at the following rates, 52.7%, 42.9% and 4.4% respectively, while the vocational concentrators indicated the following rates, 58.8%, 22.1% and 19.1% respectively.

The general concentrators indicated at the rates of 62.8% and 18.1% they would now choose college preparation and vocational education respectively as a high school curriculum if they had another chance. The vocational concentrators indicated at the rates of 52.8% and 32.3% they would now choose college preparation and vocational education respectively as a high school curriculum if they had another chance.

In an attempt to gain another perspective of the perceptions of the subjects of this study toward their choice of high school courses and their overall experience in high school, the following two questions were posed:

> Which of the following categories best describes how satisfied you are now about your choice of high school courses?

> Please consider all aspects of your high school experience (classes, teachers, counselors, extra-curricular activities, preparation for the future, etc) and then use the following scale to rate your overall experience in high school.

No significant difference in satisfaction with their high school curriculum was measured between the general concentrators and vocational concentrators. Also, no significant difference in the rating of their overall high school experience was measured between the general concentrators and vocational concentrators.

CONCLUSIONS

Based on the findings of the study the authors have drawn the following conclusions:

1. The vocational concentrators accounted for more of the sample population than expected.

2. Vocational concentrators had taken less academic courses and more vocational courses than did the general concentrators, with the substitution being relatively equal across the academic subject matter areas. However, if the respondents had the opportunity, they would now choose high school courses best described by the college preparation and vocational education curriculum rather than general education.

3. No difference in satisfaction with their high school curriculum and high school experience in general was found between vocational concentrators and general concentrators contrary to the prediction by the National Commission on Secondary Vocational Education.

4. While vocational concentrators earned slightly lower high school GPA's and class rank than did the general concentrators, the scores received on the ACT by the vocational concentrators were considerably lower than those of the general concentrators. In addition, the vocational concentrators had a considerably lower rate of graduating from college.

5. The general concentrator group of respondents had a much higher rate of continuing their education the fall after graduation than did the vocational concentrators, while the vocational concentrators had a much higher rate of employment at that time.

6. Employment or placement services helped the vocational concentrators more in finding their first job while direct contact with an employer was cited at the highest rate for both groups, however, vocational concentrators indicated having major problems finding a job at a higher rate than did general concentrators. This is a surprising conclusion considering job seeking skills are a major component of many vocational programs.

7. No reason for leaving their first job was paramount for either groups save the general concentrators cited school reasons the most and the

vocational concentrators cited a promotion the most; those two citations do not seem surprising outcomes.

8. The vocational concentrators had a slightly higher rate of employment five years after graduation but the advantage was not to the degree expected when the number of general concentrators still in school was considered.

IMPLICATIONS

The authors perceived the following implications of the findings and conclusions of this study:

1. Vocational concentrators complete less academic credits in high school and on the measure of GPA and ACT test scores achieve significantly less than general concentrators. The consequence(s) for life was not clearly discernible from the results of this study, however, these results do give some credence to the often heard arguments that in order for a student to participate in a vocational program academics must be sacrificed.

2. Vocational concentrators do not enjoy an overwhelming advantage over their peers in terms of first time employment. An advantage here has often been a major selling point of vocational educators; perhaps the emphasis on employment skills is more in theory than practice.

3. A large portion of the respondents would chose a college preparation curriculum and to a lesser extent a vocational education curriculum for high school if given another chance. If the respondents indeed understand the differences among the 3 curriculums (general, college preparation and vocational), their choosing, if given another chance, a more demanding (college preparation) curriculum or a more job oriented (vocational education) curriculum may be a better indication of satisfaction with their high school curriculum than the specific questions asked in this study.

4. Further work needs to be done to determine the effect of curriculum concentration on employment and life later than 5 years after high school.

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Table 1

Criterion variables, means, F-values and significances of the F-values by the high school curriculum of the respondents.

Criterion Variable	Mean Std Dev		F-value	Significance
	General Concentrators	Vocational Concentrators		
n =	857	1225		
Mathematics credits	5.9650 2.1027	4.8516 1.9312	149.7223	0.0000
Science credits	5.8564 2.1437	4.7834 1.6688	158.5652	0.0000
English credits	8.7136 2.0137	8.2261 1.6150	36.2325	0.0000
Social Studies credits	7.4346 2.0381	6.9598 1.9600	27.5177	0.0000
Humanities/Fine Arts credits	6.9341 4.4627	4.7659 3.2698	141.3154	0.0000
Other academic credits	6.0412 2.9537	5.9910 2.7245	0.1536	0.6951
Academic credits	39.7379 5.6423	34.2392 5.2646	500.4460	0.0000
Vocational credits	4.8016 2.7215	10.8955 3.8176	1473.6988	0.0000
Total credits	44.4137 4.5147	45.2230 4.2864	16.5949	0.0000
High school GPA	2.7989 0.7150	2.7239 0.6276	6.1359	0.0133
High school class rank *(percentile)*	0.4506 0.2923	0.5098 0.4538	10.5427	0.0012
n =	399	482		
ACT Mathematics	18.3509 8.0761	14.9647 7.5674	41.1210	0.0000
ACT English	18.9323 5.2522	17.3340 4.9905	21.3507	0.0000
ACT Natural Science	23.3183 5.9951	20.1909 5.8492	61.0107	0.0000
ACT Social Studies	20.2256 7.2034	16.6515 6.8993	56.2872	0.0000
ACT Composite	20.3383 5.8562	17.4191 5.3356	59.8050	0.0000

A PROFILE OF HIGH SCHOOL AND BEYOND EXPERIENCES OF 1983 HIGH SCHOOL GRADUATES DESCRIBED WITHIN THE HIGH SCHOOL CURRICULUM CONCENTRATION OF THE GRADUATES

A Critique

Glen C. Shinn, Clemson University--Discussant

This research addressed the effects of the high school curriculum on measures of success. The introduction highlighted somewhat negative aspects of the National Commission on Secondary Vocational Education. As a reader, I developed a defensive posture at the onset.

The purpose and objectives were clear and ambitious. A canvass of the Class of 1983 in Idaho was a major undertaking. The procedures were well described and replicable. I commend the researchers on an aggressive data collection phase; an accessible population of 1381 and a 53% usable return was laudable. Perhaps the authors should write a book to compete with Dillman.

The findings were particularly well organized by objective. Students who enrolled in more vocational education conversely enrolled in fewer other courses. Students who enrolled in vocational education scored lower on the composite ATC. Students who enrolled in vocational education were more likely to go to work. Perhaps two surprises: (1) Students who enrolled in vocational education had a higher "unemployment" rate than students who enrolled in a general concentration (Objective 3). How was self-employed noted in the instrument? (2) Students had difficulty in accurately classifying their curriculum (Objective 4). It was not clear how the new category, "college preparation," was used in the study. I was suspect of the desire to change past curriculum when the student had difficulty in classifying the curriculum in which they were enrolled. It appeared there were no differences in the satisfaction; however, the effects of curriculum may fade when all aspects of the high school experience were considered.

The conclusions section was based directly on the findings and was presented in a straightforward manner. The implications section, however, made several quantum intuitive leaps: (1) In order to participate in a vocational program, academics must be sacrificed. With all of the complexity of the people, it is dangerous to imply cause and effect. (2) Hindsight is 20/20. There were likely valid reasons why a student enrolled in a particular course of study.

I commend the researchers for their work. They obviously were not afraid to tackle Goliath.

FOLLOW-UP OF FEMALE GRADUATES OF THE COLLEGE OF AGRICULTURE AT OKLAHOMA STATE UNIVERSITY: 1985-1989

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INTRODUCTION

In order to survive as a source of information and training for today's agriculture, Oklahoma State University (OSU), as well as other universities, constantly must be in touch with the changing political, social, and economic structure of society (Drueckhammer, 1985). Throughout history, women have always contributed to agriculture in a variety of ways. Their contributions though, have been valued less than men's in the past (Sachs, 1983). Today, women are slowly gaining visibility in agricultural fields. According to figures from the U.S. Department of Education, only 4.2% of students earning a Bachelor of Science degree in Agriculture and Natural Resources in 1970 were female. By 1985, this number had increased to over 31%. To be accepted in traditionally male professions though, women generally have to work harder and cannot allow themselves as many mistakes as a man in a comparable position (Trescott, 1984). In one of Knight's studies (1987), 31% and 29% respectively of the female vocational agricultural teachers in Ohio reported experience with sexual discrimination and sexual harassment. "In this day and age, these kinds of numbers give cause for concern" (p.83).

In the College of Agriculture at Oklahoma State University, female B.S. graduates represented 20% to 24% of all B.S. graduates during the last five years. With the changes taking place in the agricultural industry and with more nontraditional fields of training and employment becoming available to women, it is important for the College of Agriculture at OSU to evaluate its programs in regard to female students and their particular situation.

PURPOSE AND OBJECTIVES

The purpose of the study was to gather specific information from the female students who graduated from 1985-1989 with a B.S. degree from the College of Agriculture at OSU. The specific objectives were: (1) To identify current positions of female graduates. (2) To determine female graduates' perceptions of the degree of relationship between their area of employment and their college degree. (3) To determine the adequacy of the programs within the College of Agriculture as perceived by female graduates. (4) To determine factors female graduates perceive as enhancing or inhibiting satisfactory employment in their field of study. (5) To determine the perceptions of female graduates as to sex bias and sex stereotyping in the area of their college training and their work.

PROCEDURES

The study population consisted of 252 female B.S. graduates from the College of Agriculture at Oklahoma State University (OSU) who received their degree from 1985-1989, whose names were on the list obtained from the OSU Alumni Association, and who could be reached by the domestic phone system. The data were obtained through phone interviews conducted by the researcher. Comparing mail questionnaires and telephone surveys, Finley & Key (1983) found that telephone surveys were more economical and resulted in a higher percentage of useable and reliable responses. In the development of the questionnaire, related literature and instruments used in similar studies were reviewed. Several questions from Drueckhammer's instrument (1985) were adopted. The questionnaire was critiqued by several professors in the College of Agriculture, pilot tested with several former agricultural students who were not part of the study population, and approved by the OSU Institutional Review Board before data collection was started. One hundred ninety-two graduates (76% of the study population) participated in the study.

ANALYSIS OF DATA

Descriptive statistics were used in the data analysis since the total study population was surveyed. Responses for each question were grouped and frequency scores, percentages, and means were calculated for the College of Agriculture total and for each department separately.

Each of the questions regarding respondents' perceptions of the instructional program quality and effectiveness in the College of Agriculture utilized one of the following scales (see Table 1): POOR (1.00-1.49), AVERAGE (1.50-2.49), GOOD (2.50-3.49), EXCELLENT (3.50-4.00) or NO BENEFIT (1.00-1.49), LITTLE BENEFIT (1.50-2.49), MODERATE BENEFIT (2.50-3.49), GREAT BENEFIT (3.50-4.00). The following response categories and point values were used with questions pertaining to respondents' extent of agreement as to being treated differently because of being a female in the field of agriculture (see Table 2): STRONGLY DISAGREE (1.00-1.49), SLIGHTLY DISAGREE (1.50-2.49), SLIGHTLY AGREE (2.50-3.49), STRONGLY AGREE (3.50-4.00).

RESULTS

The distribution of respondents by degree majors was as follows: 68 in Animal Science (35.42%), 52 in Agricultural Economics (27.08%), 16 in Horticulture (8.33%), 15 in Agricultural Communications (7.81%), 10 in Landscape Architecture (5.21%), seven each in Agricultural Education, Agronomy, and Forestry (3.65%), three each in General Agriculture and Pre-veterinary Medicine (1.56%), and two each in Biochemistry and Entomology (1.04%). None of the respondents had majored in Agricultural Engineering, Mechanized Agriculture, or Plant Pathology.

At the time of data collection, 145 graduates (75.52%) held full-time employment. Twenty-two of the graduates without full-time positions were students, 10 were unemployed, eight homemakers, and seven held part-time jobs. A comparison of the relationship of the B.S. degrees of respondents to their first and present employment showed a slight decrease of jobs in the field of college study and an increase in not related positions for present jobs. Agricultural Education majors who had a high percentage of not related jobs after graduating (57.14%) showed an increase in related jobs in regard to current positions.

Salary ranges for the first position after graduation varied from "Below $10.000" to "30,000-$39,999". The "10,000-$19,999" range had the highest percentage of responses. For present positions a slight increase in salary ranges could be noticed.

Table 1 contains a summary of respondents' perceptions of instructional program quality and effectiveness in the College of Agriculture at OSU. Total overall numerical means were calculated for each degree major area and for the

TABLE 1

SUMMARY OF RESPONDENTS' PERCEPTIONS OF INSTRUCTIONAL PROGRAM QUALITY AND EFFECTIVENESS IN THE COLLEGE OF AGRICULTURE AT OSU

	Mean Responses by Selected Quality/Effectiveness Factors				
Degree Major	Instructors	Course Content	Equipment and Facilities	Preparation for First Position	Amount of Benefit to Career
Agricultural Communications	3.07 Good	2.80 Good	2.60 Good	2.87 Good	3.40 Moderate
Agricultural Economics	3.44 Good	3.06 Good	2.83 Good	2.76 Good	3.06 Moderate
Agricultural Education	3.29 Good	3.00 Good	3.43 Good	2.60 Good	3.14 Moderate
Agriculture (General)	2.67 Good	2.67 Good	2.67 Good	2.00 Average	2.33 Little
Agronomy	3.29 Good	3.43 Good	3.00 Good	3.29 Good	3.86 Great
Animal Science	3.35 Good	3.03 Good	3.15 Good	2.67 Good	3.24 Moderate
Biochemistry	3.00 Good	3.00 Good	2.50 Good	3.00 Good	3.00 Moderate
Entomology	3.00 Good	2.50 Good	1.50 Average	2.00 Average	2.50 Moderate
Forestry	3.14 Good	2.86 Good	2.71 Good	3.00 Good	2.86 Moderate
Horticulture	3.25 Good	3.00 Good	2.62 Good	2.64 Good	3.12 Moderate
Landscape Architecture	2.10 Average	2.50 Good	2.10 Average	2.50 Good	3.30 Moderate
Pre-veterinary Medicine	3.00 Good	3.00 Good	3.67 Excellent	2.67 Good	3.33 Moderate
Total	3.24 Good	2.98 Good	2.88 Good	2.72 Good	3.18 Moderate

College of Agriculture total regarding the different quality/effectiveness factors in the evaluation of the instructional program. These means were utilized as a measure of tendency towards positiveness. The degree majors arranged according to the power of their means were as follows: Agronomy (3.37), Agricultural Education and Pre-veterinary Medicine (3.13), Animal Science (3.10), Agricultural Economics (3.03), Agricultural Communications (2.95), Horticulture (2.93), Forestry (2.91), Biochemistry (2.89), Landscape Architecture (2.50), General Agriculture (2.47), and Entomology (2.30). The mean response for the College of Agriculture total was 3.01.

Asked what they would do if they could remake their decision regarding study in the College of Agriculture at OSU, 67.71% of the respondents indicated they would choose the same degree again.

Mean responses by extent of agreement of being treated differently during college, while seeking employment, and in the job because of being a female in the field of agriculture were calculated and are reported in Table 2. The highest overall mean response (2.52%) was obtained when respondents were asked about having been treated differently while seeking employment.

Determined by responses to open-ended questions, stereotypes and beliefs regarding females and difficulties in job placement were considered important barriers women face in the field of agriculture.

CONCLUSIONS

1. Since female students chose majors in Agricultural Communications and General Agriculture combined, in Animal Science and Pre-veterinary Medicine combined, and in Horticulture and Landscape Architecture combined proportionately more often, and majors in Agricultural Education, Agronomy, and Biochemistry less often, and since none of the respondents had majored in Agricultural Engineering, Mechanized Agriculture, or Plant Pathology, it is concluded that degree choice decisions in the College of Agriculture differ between female and male students.

2. Because a high percentage of graduates with a degree in Agricultural Education, Agricultural Economics, and Animal Science indicated no relationship between their first position and their B.S. degree and a high percentage of graduates with a degree in Agricultural Economics and Animal Science indicated no relationship between their present position and their B.S. degree, it is concluded that female graduates in some degree major areas encounter difficulties in finding employment in their field of study.

3. It is concluded that female students in general feel positive about their college education in regard to quality of instructors, course content, equipment and facilities. Landscape Architecture majors (represented by 10 respondents) rated their instructors, equipment and facilities and Entomology majors (represented by two respondents) their equipment and facilities as "average" indicating areas of possible improvements.

4. In general, the female graduates in most degree major areas felt their college training had prepared them adequately for their first position after graduation. General Agriculture and Entomology majors (represented by three and two respondents respectively) rated the effectiveness of their degree programs as preparation for their first position as "average" indicating that improvements could be made in these areas.

5. Since over 50% of the female graduates with majors in Agricultural Education and Landscape Architecture would not choose the same degree again if they could remake their decision, it is concluded that their expectations regarding their degree major were not met.

TABLE 2

PERCEPTIONS OF RESPONDENTS AS TO BEING TREATED DIFFERENTLY BECAUSE OF BEING A FEMALE IN THE FIELD OF AGRICULTURE

Degree Major	Mean Responses by Extent of Agreement of Being Treated Differently at Selected Points in Career Path		
	During College	While Seeking Employment	On the Job
Agricultural Communications	1.73 Slightly disagree	2.60 Slightly agree	1.93 Slightly disagree
Agricultural Economics	1.56 Slightly disagree	2.57 Slightly agree	2.35 Slightly disagree
Agricultural Education	1.86 Slightly disagree	3.75 Strongly agree	3.33 Slightly agree
Agriculture (General)	1.33 Strongly disagree	2.67 Slightly agree	2.67 Slightly agree
Agronomy	2.43 Slightly disagree	1.86 Slightly disagree	2.14 Slightly disagree
Animal Science	1.89 Slightly disagree	2.66 Slightly agree	2.42 Slightly disagree
Biochemistry	1.00 Strongly disagree	2.50 Slightly agree	3.00 Slightly agree
Entomology	2.00 Slightly disagree	2.00 Slightly disagree	1.00 Strongly disagree
Forestry	2.00 Slightly disagree	2.50 Slightly agree	2.40 Slightly disagree
Horticulture	1.69 Slightly disagree	2.25 Slightly disagree	2.50 Slightly agree
Landscape Architecture	1.30 Strongly disagree	1.80 Slightly disagree	2.56 Slightly agree
Pre-veterinary Medicine	2.00 Slightly disagree	2.00 Slightly disagree	2.00 Slightly disagree
Total	1.74 Slightly disagree	2.52 Slightly agree	2.36 Slightly disagree

6. In general, married respondents felt more positive about the influence of their marital status on their careers than single women.

7. Respondents' assessments as to the influence having children had on their career varied widely. However, not having children was generally considered to positively influence respondents' careers.

8. Even though several factors seemed to influence respondents' careers (e.g., marital status, having children), the majority of them responded that their gender had not influenced their career.

9. The majority of graduates felt they were not treated differently during their college education because of being a female in the field of agriculture, indicating that the College of Agriculture in general is acceptive and supportive of female students.

10. Over half of the respondents who had been looking for a job in agriculture felt they were treated differently while seeking employment because of being women in the field of agriculture, with their comments indicating that it is more difficult for women to find employment in agriculture than for men.

11. Respondents' suggestions for improvements in the College of Agriculture included a high percentage of responses related to job placement. This indicates that the graduates felt this was an area deserving increased attention.

12. About half of the respondents working in agricultural fields felt they were treated differently in their jobs because of being a female in the field of agriculture, indicating a lack of acceptance of women in agricultural professions.

RECOMMENDATIONS

1. Since there is a difference in degree choices in the College of Agriculture between female and male students, it is recommended that the College of Agriculture and its individual departments evaluate their recruitment and publicity strategies to ensure equal encouragement of and openness towards female and male students.

2. Since a high percentage of female graduates in several degree major areas (Agricultural Education, Agricultural Economics, Animal Science) perceived no relationship between their first and present position and their B.S. degree, it is recommended that the College of Agriculture evaluate its degree programs to ensure training of graduates in fields in which employment is available.

3. Since most graduates who were presently employed full-time expressed satisfaction with their employment, it is recommended that the College of Agriculture continue encouraging female students to pursue degrees in agriculture.

4. Since the overall ratings of instructors, course content, equipment and facilities in the College of Agriculture were generally positive, it is recommended that the College of Agriculture continue to provide students with high quality programs. Since Landscape Architecture majors rated their instructors, equipment and facilities as only "average," it is recommended that special efforts be undertaken to determine how students' needs can be better met in that area.

5. Since General Agriculture and Entomology majors rated the effectiveness of their degree programs as preparation for their first position after graduation only "average" and since over 50% of graduates with majors in Agricultural Education and Landscape Architecture would not choose the same

major again, efforts should be taken to further evaluate these degree programs to determine what changes might be needed to better serve the needs of students.

6. Since it is harder for female than for male students to find employment in agriculture, it is recommended that the College of Agriculture expand its placement services regarding female students through department contacts and the Agricultural Placement Center.

7. Since it is harder for women to find employment in agriculture and to be accepted within the different agricultural professions, it is recommended that the College of Agriculture offer additional support programs for female students during their college training as part of their preparation for their future careers.

8. Since differences in enrollment patterns in the College of Agriculture exist between female and male students, it is recommended that further research be conducted: (a) to determine and compare factors in the decision making process of female and male students regarding their degree choices, and (b) to determine and compare numbers of female and male students changing their major to a non-agricultural field, transferring to another institution, or dropping out of college and reasons for their decision to discontinue their education in the different departments in the College of Agriculture at OSU.

9. Since female graduates perceive difficulties in finding employment, it is recommended that further research be conducted to determine and compare female and male graduates' expectations regarding job placement services and future employment, methods they utilize while seeking employment, and other related factors.

10. Since the study population for this study was comprised of B.S. degree graduates, it is recommended that further research with similar objectives be conducted with female Masters and Doctoral students.

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FOLLOW-UP OF FEMALE GRADUATES FOR THE COLLEGE OF AGRICULTURE AT OKLAHOMA STATE UNIVERSITY: 1985-1989

A Critique

Glen C. Shinn, Clemson University--Discussant

The introduction summarized the changing role and scope of women in agricultural industry. The change in the proportion of women in baccalaureate degree programs in agriculture at Oklahoma State University warranted follow-up study. In today's society, there is merit in eliminating any form of discrimination based on gender. I was somewhat reluctant, however, to accept the premise of Trescott (1984) without supporting evidence.

The purpose and five research objectives were clear and attainable.

The procedures section did not provide enough detail to allow independent replication. The definition of program quality and effectiveness was not clearly described. As a reader, there was confusion in juxtaposed statements regarding the population size (N=252), sample size (n=192) and that "descriptive statistics were used . . . since the total study population was surveyed." In any event, a telephone survey of 192 subjects was commendable and the use of descriptive statistics was an appropriate choice.

Perceptions are difficult to measure and warrant special documentation and verification. This was especially critical with small cell sizes associated with individual academic departments. Research techniques including triangulation and ethnographic methods may have been more appropriate for the purpose of this study.

It would have been helpful if the findings were reported in the order of research objectives. Findings regarding salary did not appear to be a part of the original research objectives. The assertion regarding "open-ended questions, stereotypes and beliefs regarding females" also appeared to go beyond the initial objectives. It was not clear how these data were analyzed. The plural form of "quality/effectiveness factors" caused some confusion in interpretation. It appeared a single observation was collected to measure this criterion. It would have been helpful in interpreting and analyzing the findings if standard deviations and other measures of central tendency were reported. Were the data normally distributed? As a part of the Results section, the following statement was unclear: "Agricultural Education majors who had a high percentage of not related jobs after graduating (57.14%) showed an increase in related jobs in regard to current positions."

Generally, the conclusions were drawn from the findings. Conclusions 6, 7, 8, 11 and 12 do not appear to have supporting evidence in the results section. Recommendation 6, 7, and 8 appear to be independent of the findings of this study.

STUDENT PERCEPTIONS OF CHARACTERISTICS AND ACTIVITIES CONTRIBUTING TO THE EFFECTIVENESS OF VOCATIONAL AGRICULTURE TEACHERS

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INTRODUCTION

Our society has an ongoing desire to discover valid and reliable criteria with which to distinguish effective teachers from less effective teachers. Each year community organizations, teacher associations, and graduating classes identify their "Teacher of the Year," "Outstanding Teacher," "Best Teacher," or "Teacher of Teachers."

The identification of these teachers is not necessarily based on sound research. According to Rosenshine (1986), a decade of research on teaching has firmly established the effectiveness of systematic, step-by-step instruction. The research on effective teaching conducted since 1974 has yielded a pattern of instruction that is particularly useful for teaching a body of content or well defined skills.

Some of the first behavior patterns distinguishing effective from ineffective teaching were reported by Rosenshine and Furst (1973). These behavior patterns include clarity, variability, enthusiasm, task-orientation or a businesslike approach, criticism, teacher indirectness, student opportunity to learn criterion materials, and use of structuring comments.

Brophy and Good (1986) concluded that effective teaching is the result of choosing and combining appropriate teaching behaviors in terms of both context and goals. Repetition of a few basic teaching skills does not lead to effectiveness in teaching because the teaching situation constantly changes. The expert teacher not only knows what to do but also when, where, with whom, and for how long to do it.

Wineiger (1985) reported that an instructor's competence in every field of agriculture would not be enough, even if that were possible. Effective teachers of vocational agriculture attempt to stay current in the field, provide motivation, and set a personal example of appropriate conduct in and out of the classroom.

Most of research conducted on teacher effectiveness tended to focus on adult perceptions of effectiveness (Bloom, 1976; McDaniel, 1986). Little has been done, however, to determine those characteristics students feel contribute to the effectiveness of vocational agriculture teachers. The researchers believed that student perceptions are important in determining the characteristics of effective teachers. Regardless what the students' achievements might have been or how others may perceive the instructor, students ultimately determine whether a teacher is effective and whether a program is filling their needs by continuing to enroll in the classes offered.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the extent to which students agree that certain characteristics and activities of vocational agriculture teachers make them more effective. The objectives were to: 1) determine selective background information of the responding students; and 2) determine the extent to which students agree that specific characteristics and activities of vocational agriculture teachers in the categories of teacher-student relations, personal characteristics, instruction, FFA, and Supervised Occupational Experience programs make teachers more effective.

PROCEDURES

The population of this study consisted of all eleventh and twelfth grade students enrolled in vocational agriculture programs in North Dakota during the fall of 1988. A sample of students was drawn by randomly selecting schools to participate. It was estimated that an average of 15 to 20 eleventh and twelfth graders were enrolled in each of the 83 North Dakota high schools offering vocational agriculture. This estimate was based on enrollment figures from 1986-87 when 1,642 North Dakota high school juniors and seniors were enrolled in vocational agriculture classes.

According to Krejcie and Morgan (1970), a sample size of 313 was necessary for a population of 1,700. To acquire the sample, 25 schools were randomly selected. A vocational agriculture teacher in each of the schools was then asked to administer the questionnaire to all students in grades 11 and 12 enrolled in the program. A final sample of 415 students were surveyed.

Data were gathered by use of a mail survey questionnaire developed by the researchers. The instrument consisted of two sections: Section one asked each student to supply background information; Section two contained the characteristics and activities about which the students were asked to respond. Some characteristics and activities included were those identified from previous research, while others were characteristics and activities believed by the researchers to be practices advocated as important in a vocational agriculture program. The questionnaire was pilot tested for content validity and understandability by administering it to students in a school that was not included in the sample. Final revisions of the instrument were made following the pilot test.

A cover letter, questionnaires, and a return envelope were mailed to each of the 25 randomly selected vocational agriculture program instructors in November, 1988. Those who had not responded after two weeks were telephoned and asked to administer the questionnaire. Within a short period of time, all teachers returned the questionnaires from their students. Totally, 415 responses were received.

ANALYSIS OF DATA

The collected data were entered into a computer for analysis. Frequencies and percentages were used to report results regarding background characteristics of the responding students. To determine the extent to which students agreed that the characteristics and activities that make vocational agriculture teachers more effective, data were analyzed using frequencies, mean scores, and standard deviations. The reliability of the instrument was determined to be .947 using Cronbach's Alpha.

RESULTS

Personal Characteristics: A total of 55 percent of the responding students were high school seniors, 43.1 percent were juniors, and 1.9 percent did not respond to the question. A total of 42.9 percent had taken three years of vocational agriculture previously, 41.9 percent had taken two years, 8.9 percent one year, and 6.3 percent had not taken a previous vocational agriculture class.

Agreement with Selected Characteristics and Activities: The second objective of this study sought to determine the extent to which students agree that specific characteristics and activities of vocational agriculture teachers make teachers more effective. Students were asked to indicate their level of agreement with each statement using the following scale: 5 = strongly agree, 4 = slightly agree, 3 = neither agree nor disagree, 2 = slightly disagree, 1 = strongly disagree.

Table 1 reports the extent to which high school junior and senior vocational agriculture students agree that teacher characteristics and activities in the category of "Teacher-Student Relations" make teachers more effective. The students were in some agreement that each of the stated characteristics or activities contributed to the effectiveness of vocational agriculture teachers.

Table 1

Extent to Which Vocational Agriculture Students Agree That Teacher Characteristics and Activities in the Category "Teacher-Student Relations" Make Teachers More Effective

Statement - Vocational agriculture teachers should:	N	Mean*	S.D.
1. allow students to express opinions on subject matter.	413	4.43	0.598
2. push the students to their full potential.	415	3.69	0.939
3. set high standards for students.	415	3.72	0.879
4. try to understand student problems and concerns.	414	4.20	0.798
5. insist that students be courteous to other students.	415	4.00	0.811
6. insist that students be courteous to people in positions of authority.	414	4.02	0.813
7. make students feel that each one contributes individually to the success of the class.	415	4.00	0.814
8. praise good student performance.	415	3.99	0.890
9. become close personal friends with some students.	411	3.41	1.068
10. change the due dates of assignments if students have other activities which take up their time.	415	3.67	1.150
11. set up a discipline plan so students will know in advance the consequences of their actions.	415	3.73	0.992

*5=strongly agree; 4=slightly agree; 3=neither agree nor disagree; 2=slightly disagree; 1=strongly disagree

Statements rated the highest were: "allow students to express opinions on subject matter" (4.43), "try to understand student problems and concerns" (4.20), and "insist that students be courteous to people in positions of authority" (4.02). The statement rated lowest was "become close personal friends with some students" (3.41).

High school junior and senior vocational agriculture students agreed more strongly that statements in the "Personal Characteristics" category contribute to making vocational agriculture teachers more effective than they did with statements in any other category. Table 2 indicates that the statements receiving the highest ratings in this category include: "be committed to helping students learn" and "enjoy teaching" (4.34), "show enthusiasm for teaching" (4.32), and "serve as good role models for students" (4.21). "Show their commitment to teaching by belonging to professional teacher organizations" (3.48) received the lowest rating in this category.

Table 2

Extent to Which Vocational Agriculture Students Agree That Teacher Characteristics and Activities in the Category "Personal Characteristics" Make Teachers More Effective

Statement - Vocational agriculture teachers should:	N	Mean*	S.D.
1. show enthusiasm for teaching.	414	4.32	0.713
2. serve as good role models for students.	415	4.21	0.748
3. be committed to helping students learn.	414	4.34	0.734
4. show their commitment to teaching by belonging to professional teacher organizations.	414	3.48	0.917
5. enjoy teaching.	413	4.34	0.698
6. be self-confident and poised.	413	4.18	0.700
7. be prompt and on time.	412	4.06	0.841
8. be neatly dressed and well groomed.	412	3.76	0.911

*5=strongly agree; 4=slightly agree; 3=neither agree nor disagree; 2=slightly disagree; 1=strongly disagree

Table 3 reports that the characteristics and activities in the category of "Instructional Planning, Delivery, and Evaluation" rated highest by students were: "give precise clear instructions" (4.38), "provide a comfortable learning environment (classroom and lab)" (4.22), "help students learn to think for themselves" (4.21), and "state objectives clearly so students will be aware of class expectations" (4.19). "Frequently review previously studied material" with a mean of 3.64 was the lowest rated statement in this category.

Table 4 shows the extent to which junior and senior vocational agriculture students agree that selected activities in the category of "FFA" makes teachers more effective. Statements rated highest were: "let the members make decisions for the chapter" (4.12) and "encourage members to hold an annual banquet" (4.10). Students rated "give students classroom points for being in FFA" with a mean of 3.44 the lowest.

Table 3

Extent to which Vocational Agriculture Students Agree That Teacher Characteristics and Activities in the Category "Instructional Planning, Delivery, and Evaluation" Make Teachers More Effective

Statement - Vocational agriculture teachers should:	N	Mean*	S.D.
1. give precise clear instructions.	412	4.38	0.652
2. state objectives clearly so students will be aware of class expectations.	413	4.19	0.666
3. clearly state the long term goals of the class.	414	4.01	0.741
4. encourage creativity.	412	4.14	0.738
5. help students learn to think for themselves.	413	4.21	0.759
6. make students responsible for their own learning.	412	3.78	0.983
7. frequently check for students' understanding of the subject matter.	414	3.94	0.824
8. frequently review previously studied material.	413	3.64	0.899
9. fairly and consistently evaluate students' progress.	411	3.86	0.782
10. give frequent feedback so students know how well they are doing.	413	4.13	0.745
11. give grades according to students' individual abilities.	414	3.95	0.992
12. give students an opportunity to increase a grade by doing extra credit assignments.	414	3.98	0.985
13. be knowledgeable in all areas of instruction (soils, livestock, mech., agribusiness, etc.)	414	4.11	0.829
14. be able to connect daily lessons to other topics, current events, or personal lives.	414	3.98	0.793
15. relate personal stories/experiences to the subject matter.	412	3.86	0.913
16. use a variety of teaching procedures.	414	4.02	0.738
17. conduct well-organized classroom presentations/ activities.	411	4.01	0.762
18. prepare several hands-on student activities.	414	4.12	0.835
19. individualize instruction to meet the needs of each student.	412	3.80	0.816
20. offer options within each subject area in terms of assignments, topics, evaluation, and discussion.	413	3.81	0.832
21. invite guest speakers to class.	413	3.97	0.867
22. use audio/visual aids to enhance teaching.	413	4.14	0.789
23. provide a comfortable learning environment (classroom and lab).	413	4.22	0.750
24. direct students to additional resources outside the classroom.	413	3.99	0.835
25. provide career opportunity information.	414	4.15	0.797

*5=strongly agree; 4=slightly agree; 3= neither agree nor disagree; 2=slightly disagree; 1=strongly disagree

Table 4

Extent to Which Vocational Agriculture Students Agree That Teacher Characteristics and Activities in the Category "FFA" Make Teachers More Effective

Statement - Vocational agriculture teachers should:	N	Mean*	S.D.
1. organize summer campouts, picnics, and/or other recreation as chapter activities.	410	3.82	0.955
2. promote recreational activities and fellowship.	410	3.93	0.882
3. encourage 100% member involvement at meetings through committees and programs of work.	408	3.90	0.933
4. encourage students to participate in other appropriate activities such as speaking events, judging contests, and parliamentary procedure.	410	3.90	0.868
5. let the members make decisions for the chapter.	409	4.12	0.764
6. encourage members to hold an annual banquet.	410	4.10	0.880
7. encourage programs such as Building Our American Communities, Safety, and Food for America as part of the FFA program.	408	3.78	0.940
8. help students set and work toward meeting personal goals.	409	4.09	0.717
9. use class time to complete FFA activities.	409	3.72	1.008
10. give students classroom points for being in FFA.	409	3.44	1.275

*5=strongly agree; 4=slightly agree; 3=neither agree nor disagree; 2=slightly disagree; 1=strongly disagree

Activities in the category of "Supervised Occupational Experience" were in general rated lower than other categories as shown in Table 5. Activities rated highest were: "advise students how to improve their SOE program" (3.97), "become involved with county and state fairs to help students show their productive enterprises" (3.91), and "schedule SOE visits in advance with each student" (3.87). "Publicize SOE programs through newspaper, radio, television, or other organizations" was rated lowest in this category.

Table 5

Extent to Which Vocational Agriculture Students Agree That Teacher Characteristics and Activities in the Category of "Supervised Occupational Experience Programs" Make Teachers More Effective

Statement - Vocational agriculture teachers should:	N	Mean*	S.D.
1. schedule SOE visits in advance with each student.	410	3.87	0.958
2. advise students how to improve their SOE program.	410	3.97	0.887
3. just visit with students, not review record book.	408	3.28	1.133

Table 5, Continued

Statement - Vocational agriculture teachers should:	N	Mean*	S.D.
4. gear ag. mechanics projects toward student SOE programs.	409	3.63	0.926
5. assist students during the summer months with their SOE programs.	408	3.66	0.950
6. publicize SOE programs through newspaper, radio, television, or other publications.	409	3.23	1.070
7. use SOE programs as examples for class lessons.	410	3.57	0.964
8. give extra credit to students with good SOE records.	410	3.52	1.193
9. emphasize SOE program award areas for students (proficiency, record book, State FFA Degree awards).	409	3.80	0.975
10. become involved with county and state fairs to help students show their productive enterprises.	409	3.91	0.907
11. include parents in the SOE visit.	410	3.48	1.139

*5=strongly agree; 4=slightly agree; 3=neither agree nor disagree; 2=slightly disagree; 1=strongly disagree

CONCLUSIONS AND RECOMMENDATIONS

Based upon the findings of this study, the following major conclusions were formulated:

1. Because the 65 statements in the five categories to which the students responded were perceived to have at least slight agreement, it was concluded that high school junior and senior vocational agriculture students in North Dakota regard them all as characteristics and activities making vocational agriculture teachers more effective.

2. Students agreed that personal characteristics contributed most extensively to the effectiveness of vocational agriculture teachers, and the characteristics and activities related to Supervised Occupational Experience Programs contributed the least.

Based upon the findings and conclusions of this study, the following recommendations are offered for consideration:

1. Vocational agriculture teachers should be made aware of those characteristics and activities which students perceive as contributing to their effectiveness. This might be accomplished by inservice programs conducted by state staff and teacher educators in agricultural education. Teachers than can take initiative to address those characteristics and activities in their daily work.

2. Teacher educators in agricultural education might use the findings of this study to educate future teachers.

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STUDENT PERCEPTIONS OF CHARACTERISTICS AND ACTIVITIES CONTRIBUTING TO THE EFFECTIVENESS OF VOCATIONAL AGRICULTURE TEACHERS

A Critique

Michael F. Burnett, Louisiana State University--Discussant

The researchers are commended for addressing an important and significant topic in Agricultural Education. The introduction is clear and well written and the study is founded on a well developed conceptual framework. The purpose and objectives of the study clearly derive from the framework presented. Research procedures used in the study are appropriate, thoroughly described, and well documented. The sampling plan is clear, and the achievement of responses from 100% of the schools selected in the sample is especially commendable.

In reviewing the research report, however, some questions were raised which might warrant further attention and/or explanation by the researchers. These questions include:

The researchers report in the results of the study that, "The students were in some agreement that each of the stated characteristics or activities contributed to the effectiveness of vocational agriculture teachers." How was the interpretation of "some agreement" derived from the study? Students responded on a 5 point Likert-type scale where 5=strongly agree, 4=slightly agree, 3=neither agree nor disagree, and etc. It would seem to this reviewer that a mean of 3.23 or 3.41 would most appropriately be interpreted as neither agree nor disagree. However, the researchers report that all 65 items, "Were perceived to have at least slight agreement." Perhaps, a set of guidelines established to interpret the mean responses would have been beneficial. In the absence of such guidelines this reviewer would use the midpoint for an interpretative break (i.e. - 2.5 to 3.5 interpreted as undecided or neither agree nor disagree). This interpretation would place at least 5 items in the undecided category.

Could the clarity of the results have been improved by revisions in the table format? Presenting the items within each table in descending order by mean score would have made the findings more easily interpretable.

Would sub-scores for each of the categories of teacher characteristics and activities have been meaningful. The researchers seem to attempt to make overall category interpretations when they report, "Activities in the category . . . were in general rated lower than other categories." Wouldn't a category sub-score have more clearly operationalized this interpretation?

The researchers purport that, "Regardless what the students' achievements might have been or how others may perceive the instructor, students ultimately determine whether a teacher is effective . . ." Though this reviewer agrees with the researchers that student perceptions are important, the premise that high school students perceptions would constitute the ultimate measure of teacher effectiveness seems questionable.

Are more specific recommendations for practice and/or further research possible? The researchers' recommendations in this report seem to stop short of their potential.

BEGINNING VOCATIONAL EDUCATION TEACHER PERCEPTIONS OF THEIR PEDAGOGICAL KNOWLEDGE AND THEIR PERFORMANCE ON THE PROFESSIONAL KNOWLEDGE PORTION OF THE NATIONAL TEACHER EXAM

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INTRODUCTION

Darling-Hammond, Wise and Pease (1983, p.285) stated: "Over the last decade teacher evaluation has assumed increasing importance. The demand for accountability has shifted from the broad issues of finance and program management to specific concerns about the quality of classroom teaching and teachers. These concerns have led to a resurgence of interest in evaluating teachers and to the development of new systems for teacher evaluation."

Little appears to have changed since Darling-Hammond, Wise and Pease conducted this review of teacher evaluation literature. At this time, virtually every state requires tests of basic skills, subject matter knowledge, and/or professional knowledge before a teacher can receive a standard license to teach (Darling-Hammond, 1986).

In 1984, a committee of teacher educators and state vocational education consultants in Ohio met to determine the competencies which should be taught as a part of the preservice and inservice education program for vocational teachers without a degree in some area of vocational education (Barrick, 1987). The list of 25 competencies closely reflected the competencies required for regular undergraduate teacher education students.

In 1990, Ohio implemented the Teacher Education Certification Standard (State Board of Education, 1985) which required teacher candidates to complete a teacher knowledge competency examination prior to certification. Logic dictates that this competency exam should measure the teacher's knowledge as defined by the aforementioned 25 competencies.

PURPOSE AND OBJECTIVES

The purpose of this study was to compare the first-year Ohio vocational education teacher's perceptions of their knowledge competence to their score achieved on the Professional Knowledge portion of the National Teacher Exam (NTE). Four objectives were stated to guide this study:

1. To describe first-year vocational education teachers on the following characteristics: age, gender, high school grade point average, length of industry-related experience, type of school currently teaching in, amount of education received, type of teacher education received, vocational teaching specialty, the teachers' perceptions of their knowledge of the 25 competencies of teaching, and score achieved on the professional knowledge portion of the NTE Core Battery tests.

2. To compare the first-year vocational education teachers' perceptions of their knowledge of the 25 competencies of teaching to the following characteristics: age, gender, high school grade point average, length of industry-related experience, type of school currently teaching in, amount of education received, vocational teaching specialty, and type of teacher education received.

3. To compare the first-year vocational education teachers' score achieved on the professional knowledge portion of the NTE Core Battery tests to the following characteristics: age, gender, high school grade point average, length of industry-related experience, type of school currently teaching in, amount of education received, vocational teaching specialty, and type of teacher education received.

4. To compare the first-year vocational education teachers' score achieved on the professional knowledge portion of the NTE Core Battery tests to the teachers' perceptions of their knowledge of the 25 competencies of teaching.

PROCEDURES

This study is the comparison of the results of two studies conducted by the researchers. The first study (Barrick and Doerfert, 1989) was of the first-year vocational education teachers' perceptions of their knowledge of the 25 competencies of teaching. The populations for this study were all vocational education teachers in Ohio who attended the four-week intensive professional education workshop in 1988 and all first year college prepared teachers in 1988-89.

Data were collected using an instrument designed by the researchers. Respondents indicated their perceptions of their knowledge of the topic for all 25 competencies on a scale of 1 (low) to 5 (high). The instrument was assessed to be reliable based on Cronbach's alpha of .87. Instruments were mailed in February 1989 to the teachers. A 100% response rate was achieved after two mailings and a follow-up telephone call.

The second study (Doerfert and Barrick, 1990) was conducted utilizing the same populations. Two instruments were utilized to collect data for the study. The first instrument was the NTE Core Battery Professional Knowledge test found in A Guide to the NTE Core Battery Tests: Communication Skills, General Knowledge, Professional Knowledge (Educational Testing Service, 1984). The second instrument, designed by the researchers, was used to gather data about the independent variables of gender, age, high school grade point average, length of industry-related experience and amount of education received. Data concerning type of school where currently teaching, vocational service area and method of teacher preparation received were collected from records in the Department of Agricultural Education at The Ohio State University.

Data for both of these studies were coded in a similar manner to provide for the comparison of the results of the two studies. Only teachers who completed the requirements of both previous studies are reported in this study. The resulting population for this study was 32 first-year vocational education teachers. Mean scores were calculated for each of the 25 competencies with a total knowledge score also calculated. The teachers' NTE Professional Knowledge scores were calculated by totaling the number of correct answers on the exam (104 were possible). The demographic variables were described in terms of frequencies, percentages, measures of central tendency and measures of variability. The demographic variables were grouped prior to further analysis.

The first-year vocational education teachers who comprise the population of this study were viewed as a slice of time sample of the target population of all vocational education teachers. Therefore, inferential statistics were used to determine significant differences between groups. T-test, crosstabs, and oneway ANOVA tests were used to determine differences between the various subgroups. Analyses were conducted using SPSSPC+ at an alpha level of .05.

RESULTS

Ten of the 32 teachers (31 percent) in the study taught agriculture, one (3 percent) taught marketing, one (3 percent) taught office education, and 20 (63 percent) taught trade and industry classes. The age of the 32 first-year vocational education teachers ranged from 22 to 59 years, with the mean age slightly over 37 years. In the study, 25 of the 32 (78 percent) first-year teachers were males. The mean years of industry-related experience each teacher had was 18.4 years, with the range of experience being 5 to 42 years.

Six of the 32 teachers (19 percent) taught in high schools while the remaining 26 (81 percent) taught in area career centers. Twentyfive teachers provided a self-reported high school GPA which ranged from 2.00 to 4.00 with the mean GPA being 3.192. A high school diploma was the highest educational degree received by 18 of the 32 (56 percent) of the vocational teachers; 3 (10 percent) had received an associate degree, 8 (25 percent) received a bachelor's degree, 1 (3 percent) received a master's degree, and 2 (6 percent) had completed a technical school program beyond the high school level.

The first-year vocational education teachers' total score of their perceptions of their knowledge of the 25 competencies of teaching ranged from 78.00 to 125.00 (125.00 was the maximum score possible) with the mean perception of knowledge total being 101.22. The scores the teachers achieved on the NTE Professional Knowledge test ranged from 24 to 94 (104 was the maximum possible) with the mean score being 55.31.

The teachers' perceptions of knowledge total scores were grouped into two groups for further analysis with those whose total perceptions scores were 101.00 or lower being the "low perception of their knowledge" group and those teachers with a total perceptions score of 102.00 or higher being in the "high" group. In comparing the teachers' perception score to the demographic variables (age, gender, high school GPA, length of industry-related experience, type of school teaching in, type of teacher education received, amount of education received, and vocational teaching area), no significant differences (p>.05) were found. These results can be viewed in Tables 1 and 2.

In comparing the teachers' NTE professional knowledge score to the demographic variables, several significant differences (p<.05) were found.

Younger teachers (22-35 years of age; n=16) scored significantly higher than older teachers (36-59; n=16). Vocational education teachers with fewer years of industry related experience (5-15 years; n=16) scored significantly higher than teachers with a greater number of years experience (16-42 years; n=16). College-prepared teachers (n=5) scored significantly higher than industry-prepared teachers (n=27). These results can be viewed in Table 3.

In comparing the teacher's perceptions of their knowledge of the 25 competencies of teaching, teachers who perceived their knowledge to be high scored significantly lower on the NTE professional knowledge exam than teachers who perceived their knowledge of teaching to be lower. These results can be viewed in Table 4.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were reached based on the results:

1. Vocational education teachers in Ohio are not able to accurately assess their knowledge of teaching as measured by the National Teacher Exam Profesional Knowledge test.

2. Scores on the NTE Professional Knowledge test are related to the teacher's age, years of industry-related experience, and the type of teacher preparation received.

The following recommendations are made based on the conclusions:

1. School administrators, teacher educators, and state supervisors should not utilize teachers' self-evaluation of their teaching knowledge as an accurate barometer of their knowledge competence as measured by the NTE.

2. Teacher educators and many others may need to provide additional inservice education in the area of professional knowledge for older, more industry-experienced teachers who have less than a bachelor's degree.

Little research has been done to compare a teacher's percpetions of their teaching knowledge to a actual measurement of their knowledge. The small population in this study is a slice of time sample and the results, conclusions and recommendations reflect only this sample. However, if vocational education, and education in general, continues to explore alternative methods of evaluating teachers, this study should be replicated with a larger sample to utilize appropriate multivariate data analysis techniques.

The results of this study indicated that first-year vocational education teachers in Ohio cannot accurately assess their knowledge of teaching as measured by the NTE. This may imply that the 25 competencies of teaching as determined by leaders in education in Ohio are not similar to the competencies included in the NTE Professional Knowledge test. An alternative implication may be an agreement with Darling-Hammond, et al. (1983, p. 308) who stated that "self-evaluation should be regarded not as an evaluation process in itself, but as an important source of information and motivation in a broader evaluation program."

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Table 1. Summary of Comparisons Between Teachers' Perceived Knowledge Competence by Background Characteristics (Interval Data).

	Knowledge Perception					
Characteristic	Low Group[a]		High Group[a]		T-test Value	p
	Mean	SD	Mean	SD		
Age	35.67	10.96	38.76	8.59	-0.90	.378
Years of Industry Related Experience	17.53	10.94	19.24	9.03	-0.48	.633
H.S. GPA	3.23	.586	3.16	.403	-0.31	.758

[a] Low Group = Total Perception Score of 101.00 or lower; High Group = >101.00

Table 2. Summary of Comparisons Between Teachers' Perceived Knowledge Competence by Background Characteristics (Non-interval Data).

	Knowledge Perception			
Characteristic	Low Group[a]	High Group[a]	Chi Square	p
	n	n		
Gender				
Male	11	14	0.035	.8513
Female	4	3		
Type of School Teaching In				
High School	4	2	0.389	.5326
Career Center	11	15		
Amount of Education Received				
High School Diploma	7	11	0.448	.503
Post Secondary Degree	8	6		
Vocational Service Area				
Agriculture	7	3	1.92	.166
Non-agriculture	8	14		
Teacher Preparation Received				
College	4	1	1.27	.259
Industry	11	16		

[a] Low Group = Total Perception Score of 101.00 or lower; High Group = >101.00

Table 3. Summary of Comparisons Between Teachers' Professional Knowledge Competence Scores by Background Characteristics.

Characteristic	n	Mean Score	T-test Value	*p*
Age				
22-35	16	61.75	2.83	.008*
36-59	16	48.88		
Gender				
Male	25	52.96	-1.39	.206
Female	10	65.20		
High School GPA				
3.00 or Less	10	55.30	-0.87	.391
Greater than 3.00	15	59.87		
Yrs of Industry Experience				
15 or less	16	60.25	2.06	.048*
16 or more	16	50.38		
Type of School Teaching In				
High School	6	61.83	1.88	.078
Career Center	26	53.81		
Amount of Education Received				
High School Diploma	18	51.44	-1.82	.078
Post Secondary Degree	14	60.29		
Vocational Service Area				
Agriculture	10	54.60	-0.19	.852
Non-agriculture	22	55.64		
Teacher Preparation Received				
College	5	63.40	2.23	.047*
Industry	27	53.81		

* *p*<.05

Table 4. Summary of Comparison Between Teachers' Professional Knowledge Competence Scores by Teachers' Perceived Knowledge Competence.

Perceived Knowledge	n	Mean Score	T-Test Value	*p*
Low Group[a]	15	61.13	2.29	.030*
High Group[a]	17	50.17		

[a] Low Group = Total Perception Score of 101.00 or lower; High Group = >101.00
* *p*<.05

BEGINNING VOCATIONAL EDUCATION TEACHER PERCEPTIONS OF THEIR PEDAGOGICAL KNOWLEDGE AND THEIR PERFORMANCE ON THE PROFESSIONAL KNOWLEDGE PORTION OF THE NATIONAL TEACHER EXAM

A Critique

Michael F. Burnett, Louisiana State University--Discussant

The researchers are commended for addressing an important and timely topic in the field of vocational education as well as education in general. The paper is well written, and the purpose of the study is clear. Appropriate procedures were utilized to accomplish the stated objectives which were clearly described. The researcher-developed, scaled instrument was found to be reliable, and a 100% response was achieved in the first study.

The investigators are especially commended for conducting research which builds on previous work and is therefore more programmatic in nature. As the researchers point out, "This study is the comparison of two studies," and the second study was clearly designed to build on the first.

In reviewing the report some questions were raised which warrant further attention and/or explanation by the researchers. These questions include:

What procedure was used to establish the content validity of the researcher developed instruments? The validity of the perception scale might logically be inferred from the panel which established the list of 25 competencies. This would not hold true for the demographic form in the second study. On what basis were the personal and professional demographic variables selected? Were they selected because previous literature suggested their possible influence, or because they were of interest to the researchers?

Is there evidence to support the use of self-perceived knowledge? Has previous research shown a link between self-perceived abilities and actual abilities? The researchers point out that little research has been done, but even minimal support would have strengthened the rationale for the study.

The researchers reported that, "Only teachers who completed the requirements of both previous studies are reported in this study." How many subjects were eliminated because of this restriction? A 100% response rate was reported for the first study. What was the response rate for the second study?

Why was the perception score converted from an "interval-like" measurement to a categorical measurement? Weren't the researchers giving up a great deal of precision in their measurements? Relatedly, why were the perception and the NTE scores treated differently? Actually, the demographic measures were compared by the categories of the perception score; whereas, the NTE scores were compared by categories of each of the demographic measures. These differing treatments seem inconsistent. Wouldn't a logical approach have been to leave both scores as interval-like measures and compare each of them by the levels of the demographic variables?

Again, related to the previous issue, would a correlation computed between the perception score and the NTE score, both treated as interval data, have given a clearer picture of the association between these measures?

HEALTH FACTORS AS PREDICTORS OF AGRICULTURE TEACHER EFFICACY

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INTRODUCTION

Teacher efficacy can be defined as the power of a teacher to produce an effect. How important is teacher efficacy in our secondary schools today? Hoover-Dempsey, Bassler, and Brissie (1987) and Ashton and Webb (1986) all stated that teacher efficacy is positively related to educational outcomes. Trentham, Silvern, and Brogdon (1985) identified efficacy as the only differentiator of teacher competency that offers any potential for change.

Few would argue that a measure of successful teachers is their efficacy or their power to produce a desired effect. Logically, numerous factors contribute to teacher efficacy; health may be one of those factors. Little documentation can be found in the literature which states that the efficacy of teachers is related to teacher health. This study attempted to determine that relationship.

What is the health status of the teaching profession? Levine described school working conditions as demoralizing and debilitating. Studies of school environment by Landsmann (1978) and Lee and Westrom (1989) determined that over one-third of teacher respondents felt that the school environment affected the health of educators. Barter (1984) cited studies that ranked teachers second only to air traffic controllers in levels of stress.

One would expect health conditions such as those described to take its toll on teachers. Lee and Westrom (1989) reported that the average secondary agriculture teacher was absent 3.62 days during the 1986-87 school year. That rate of absenteeism among agriculture teachers cost school districts 6.5 million dollars (Vaughn, Lee, & Westrom, 1989). Spencer (1988) calculated that two billion dollars are spent each year for substitutes in the United States, but lack of substitute teacher effectiveness may be the greatest loss to schools. Bamber (1979) added that finding substitutes is a time consuming task for administrators. More importantly, she felt that substitutes contributed little, and perhaps detracted from the learning process.

Harlin, Jerrick, and Rosenthal (1976) described ten categories of health necessary for the physical and mental well-being of teachers. Nine were used in this study including: (a) injuries, (b) surgery, (c) dental, (d) emotional or psychosomatic, (e) communicable diseases, (f) orthopedic, (g) systemic, (h) pregnancy/child care, and (i) vision and hearing. Lee and Westrom (1989) delineated the categories into health factors.

Only 20% of the schools surveyed by Lee and Westrom (1989) provided agriculture teachers with access to a wellness program. The justification for educational institutions to invest dollars in the maintenance of teacher health is partially dependent on whether or not teacher efficacy is related to health care experiences and absenteeism. The search for empirical evidence to support or reject that relationship provided the impetus for this study.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine if a relationship between health and teacher efficacy existed. The research objective was to determine if health factors discriminated among high, intermediate, or low secondary agriculture teacher efficacy. The null hypothesis stated that no significant difference would exist among secondary agriculture teacher efficacy group means on the teacher health discriminant scores.

PROCEDURE

Phase I of this research was the Educator Health Study completed by Lee and Westrom in 1988. The population for Phase I included all secondary agriculture teachers listed in the 1987 Agriculture Teacher Directory. A systematic sample of 502 agriculture teachers was selected from the 12,053 names listed in the directory. A random entry point was established with the name of every 24th teacher appearing in the directory being included.

Phase II of the research study was conducted a year and one-half later. Phase II utilized an ex post facto correlational design. It necessitated the gathering of additional information about the secondary agriculture teachers. This information was gathered from the immediate administrators and state supervisors of the data sample (321) in the educator health study. The entire data sample was used based on the work of Barrick and Warmbrod (1988). They stated that when using discriminant analysis, the sample should be two or three times the number of independent variables used. There were 46 potential health factors in this study. Results obtained in Phase II have been inferred to the population in Phase I since representativeness was maintained and non-respondent follow-ups were conducted in both phases.

The dependent variables (high, intermediate, and low teacher efficacy groups) were determined from the teacher efficacy evaluation instrument (TEEI) developed by the researcher. A panel of experts reviewed the instrument to assist in determining if it met the construct and content parameters appropriate to the research objectives (Kerlinger, 1986). A Cronbach alpha coefficient of .96 for administrators and .97 for state supervisors was found on the data sample.

A modification of the total design method recommended by Dillman (1978) was used in gathering information from the sample. Data were collected via mailed questionnaires. Supervisors from all states responded. Useable TEEI for 271 (84%) of the agriculture teachers were received. Completed TEEI for 244 (76%) of the agriculture teachers were received from administrators. A non-respondent telephone follow-up (n = 20) was conducted on Phase II of the administrator group as less than an 80% response rate was achieved (Borg & Gall, 1983). No differences were found between groups.

ANALYSIS OF DATA

The statistical hypothesis was tested in two different ways for each set of criterion variables (supervisor and administrator). The criterion variable (high, intermediate, and low teacher efficacy groups) remained the same in each statistical run. The high efficacy group included the top 25% of the teachers, the intermediate efficacy group included the middle 50% of the teachers, and the low efficacy group included the bottom 25% of the teachers. The predictor variables included: (a) each of the nine health categories and (b) the correlated health factors listed as experienced or as days missed.

The statistical technique used was discriminant analysis. The analysis was performed on SAS, Version Five Edition (SAS Institute Inc, 1985).

RESULTS

The results of dependent variables using supervisor ratings will be discussed as no statistical or practical significance was found when using administrator ratings. Supervisor ratings of agriculture teacher efficacy used as criterion variables were analyzed. No significant difference existed for any health category among high, intermediate, and low efficacy group means ($p \leq .05$). The researcher failed to reject the null hypothesis based on the use of health categories (for days missed).

The second method of determining the acceptance or rejection of the null hypothesis involved the use of individual health factors (e.g., colds, minor surgery, job stress, etc.) or groups of related factors. A Pearson correlation was calculated between each health factor and the agriculture teacher efficacy groups. Two categories of health factors were correlated: (a) whether or not the teacher experienced a health factor (dummy coded, 0 = no, 1 = yes) and (b) the days missed from school due to the health factor. Health factors were used in discriminant analysis only if they were statistically significant at the 0.1 alpha level and were also of practical significance. Three individual factors (days missed for major surgery, alcohol experience, and experience of skeletal problems) and one group factor (days missed for selected systemic problems) were selected.

Table 1

Pearson Correlation Coefficients for the Relationships Between Health Factors and Agriculture Teacher Efficacy Groups (as rated by state supervisors).

Variable	r	Probability
1. Days missed for major surgery	.10	.09 *
2. Alcohol experience	.12	.04 *
3. Skeletal experience	-.11	.07 *
4. Days missed for systemic problems	-.10	.09 *
4a. Days missed for circulatory problems	-.12	.05 *
4b. Days missed for digestive problems	-.08	.19
4c. Days missed for skeletal problems	.00	.94 a
4d. Days missed for genitourinary problems	.02	.80 a
4e. Days missed for respiratory problems	-.10	.10 *
4f. Days missed for glandular problems	.09	.14 a
4g. Days missed for nervous system problems	.09	.14 a
4h. Days missed for cancer	-.14	.02 *
4i. Days missed for skin problems	-.08	.22

*$p \le .10$
a = Eliminated because of an antagonistic relationship to the "systemic" construct.

To determine if significant differences existed among agriculture teacher efficacy groups, discriminant analysis was run using the significantly correlated health factors as predictor variables. High efficacy agriculture teachers missed more days of school due to systemic problems than did intermediate efficacy agriculture teachers. Intermediate efficacy agriculture teachers missed more days of school due to systemic problems than did low efficacy agriculture teachers. The differences for days missed due to systemic problems were significant at the $p \le .05$ level as was the discriminant function. Two other factors, use of alcohol and experience of skeletal problems, loaded into the discriminant function in a meaningful way when the rules of looking at coefficients whose absolute value is not less than one-half of the largest value was applied. The significant difference between criterion groups for days missed due to systemic problems allowed the researcher to reject the null hypothesis.

Table 2

Descriptive Statistics on Predictor Variables for High, Intermediate, and Low Efficacy Agriculture Teachers (as rated by state supervisors).

Variable	High Efficacy Mean	High Efficacy SD	Intermediate Efficacy Mean	Intermediate Efficacy SD	Low Efficacy Mean	Low Efficacy SD
Days missed for major surgery	.05	.27	.12	1.03	.49	2.87
Alcohol experience	.05	.21	.15	.36	.15	.36
Skeletal experience	.23	.42	.18	.38	.11	.31
Days missed for systemic problems *	.52	1.35	.16	.63	.09	.34

*$p \leq .05$

Table 3

Discriminant Analysis Structure and Function Coefficients

Discriminating Variable	Standardized Canonical Discriminant Function Coefficients	Structure Coefficients Pooled-within group Correlations
Days missed due to systemic problems	.73	.72
Alcohol experience	-.49	-.48
Skeletal experience	.38	.37
Surgery	-.30	-.29

The consequential effects of the statistically significant discriminant function can only be interpreted by evaluating other factors. Discriminant function one was of little consequence as it explained only 7% ($.27^2$) of the variance, had an extremely low eigenvalue (.08), and a Wilks' Lambda near one. Discriminant function two was not statistically significant

Table 4

Discriminant Function Summary for Health Items as Predictors of Agriculture Teacher Efficacy

Function	r	Eigenvalue	Wilks' Lambda	DF	F	Probability
1	0.27	0.08	0.92	8	2.80	0.00
2	0.10	0.01	0.99	3	0.87	0.46

The criterion group mean differences of days missed for surgery, emotional or psychosomatic problems, systemic problems, pregnancy/child care problems, and total days missed were examined. High efficacy teachers missed .42 days less per year per teacher than intermediate efficacy teachers and .80 days less per year per teacher than low efficacy teachers. Visual analysis of this data seemed to indicate that a test of significance was warranted. One-way analysis of variance indicated no significant differences between criterion groups for any of the health categories.

CONCLUSION, IMPLICATIONS, AND RECOMMENDATIONS

This study was unable to determine a set of health factors that would accurately predict the overall effect of a teacher. The "why" becomes more important than the finding. Several plausible explanations exist:

1. Health may have little or nothing to do with the overall effect a teacher has on students. It is possible that good teachers and poor teachers alike have similar health and wellness concerns.

2. The ability of the researcher to measure teacher efficacy (effectiveness) may have been weak. Such a finding would render the results inconclusive until further studies have been conducted and the ability to measure teacher efficacy is refined.

3. High, intermediate, and low efficacy teachers alike may teach when their health is subpar.

4. Non-health factors may have such a dramatic impact on teacher efficacy that only a minute amount of variance is explained by health. Such a finding does not minimize the importance of good health.

5. Differences in teacher efficacy due to health factors may only be measurable if the teachers are used as their own control group. Efficacy of a teacher when well would be compared to the efficacy of the same teacher while experiencing subpar health.

6. The health factors that were found to be correlated to teacher efficacy may be important in and of themselves even if as predictors they don't explain much variance.

Examining the health factors that were correlated to teacher efficacy may be useful to administrators. The researcher concluded from this study that high efficacy teachers miss significantly more school due to days missed for systemic problems (e.g. circulatory problems, digestive disorders, respiratory problems, etc.) and skeletal experiences (e.g. back aches, bone problems, etc.). Both health factors are improved by good nutrition and good physical condition. Administrators and school boards can ill afford to lose their high efficacy teachers. Any assistance in maintaining their health may be money well spent. The high efficacy teachers also used significantly less alcohol than intermediate or low efficacy counterparts. Determining alcohol usage prior to hiring may be an important factor in hiring high efficacy teachers. Occasionally a finding is not shown to be statistically significant and yet has practical significance. Total days missed may be an example. High efficacy teachers missed .42 days per year per teacher less than intermediate efficacy teachers and .80 days per year per teacher less than low efficacy teachers. If inferred to the entire agriculture teacher population (12,053), the high efficacy teachers (3,013 or 25%) miss 2,411 days less of school per year than the low efficacy teachers (3,013 or 25%). That translates to 13.4 less full time equivalent substitutes per year for the combined schools that employ high efficacy agriculture teachers. A conservative estimate of savings for the 13.4 less substitute teachers would be over $300,000.

Perhaps the most important implication of this study is that much refinement and research remains in the area of teacher health. The fact that this research failed in the attempt to find a set of health factors that predict teacher efficacy may be in and of itself an important finding. Future researchers can refine and develop the construct.

Consider what is known about the health of teachers. How might it effect the teaching/learning process? Teacher health is a dynamic state that is important to all teachers. The very best of teachers suffer from more systemic problems such as respiratory disorders, circulatory problems, and digestive disorders. They also suffer from more back aches and skeletal problems. Frequently they experience more foot problems. Alcohol use and days missed due to major surgery are greater in intermediate and low efficacy teachers. Although not a statistically significant finding, it may be of practical significance to know that teachers who have the most positive effect (high efficacy) miss nearly a day less of school each year on the average than their low efficacy group counterparts.

Teachers need to consider that their well-being is important to the school that employs them. Improving ones health is of benefit to all parties, most importantly the student.

Administrators and school boards need to consider that a school is a business. Productivity is enhanced when absenteeism is reduced, teachers are healthy, and teacher retention is high.

Researchers have an open-ended opportunity when exploring teacher health. The timeliness of studying teacher health is good from two perspectives:

1. Health is a topic of interest to United States citizens. They are now vividly aware of a changed lifestyle that can easily lead to obesity or systemic problems;

2. School improvement is being sought. Well-conducted research that shows a relationship between good health and effective teaching will be examined carefully.

This study lends itself well to future studies. Similar health factors could be used with teacher efficacy data obtained from the Rand Corporation instruments. Classroom observation in a smaller geographic area may provide more accurate teacher efficacy ratings. Classroom observation would also allow a researcher to examine teacher efficacy on days a teacher was healthy versus days when the same teacher was experiencing subpar health. Finally, it may be necessary to develop a wellness program and include it in an experimental design. This would allow for evaluation of highly measurable physical traits and put more well defined boundaries on the complex behavioral traits.

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HEALTH FACTORS AS PREDICTORS OF AGRICULTURE TEACHER EFFICACY

A Critique

Michael F. Burnett, Louisiana State University--Discussant

The researchers are commended for addressing a very significant topic in Agricultural Education. The introduction is well written and clearly establishes the rationale for the study. The conceptual framework for the study, although not extensive, is well developed and supported by appropriate literature.

Research procedures utilized in the study were appropriate, well documented, and generally clearly described. The instruments were appropriately developed and validated and were found to be highly reliable as evidenced by Cronbach's alphas of .96 and .97. The researchers also used what appears to be the most appropriate analysis techniques rather than the most convenient ones.

The researchers are especially commended for efforts at making their research more programmatic in nature. This effort is made through building the current study on previous work. This should reduce the fragmentation seen in much of behavioral science research; and hopefully, make a greater contribution to the body of knowledge. The researchers were very thorough in exploring the potential implications of the study. They identified potential explanations for the study outcomes and identified directions for future research efforts.

However, some questions were raised as the research report was reviewed to which the researchers might address themselves. These questions include:

Is an 84% response rate from the administrator group adequate to accept as representative with no further follow-up? It seems plausible that administrators who perceived lower teacher efficacy might be reluctant to respond, and therefore the nonrespondents might be different from the respondent group. A highly different group of 16% could significantly change the findings.

The TEEI was a researcher developed instrument and was validated by a panel of experts. What groups were represented in the validation panel, and how large was the panel? In addition, this reviewer would have found worthwhile a sample of the contents of the TEEI. What was the nature of the response requested in the items and on what efficacy measures were responses sought?

The researchers report that, "Health factors were used in discriminant analysis only if they were statistically significant at the 0.1 alpha level and were also of practical significance." Why was the 0.1 alpha level selected in this analysis rather than the more traditional 0.05 level, especially since the 0.05 level was used in other statistical tests in the report? Also, what did the researchers consider to be practical significance? The concept of practical or substantive significance is used in widely varying contexts; and therefore needs clear definition whenever it is used.

What was meant by the footnote to Table 1 which indicated that certain variables were "Eliminated because of an antagonistic relationship to the 'systemic' construct?" In addition, how was the decision made to eliminate these variables? Was it based on a recommendation of the panel of experts or on a statistical measure?

A STUDY OF THE RELATIONSHIP OF PARTICIPATION IN IN-SCHOOL 4-H AND SELF-ESTEEM FOR STUDENTS IN THE LAS VEGAS SCHOOL SYSTEM

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INTRODUCTION

The concept of "self" and holding a favorable attitude toward oneself is considered important by a number of personality theorists (Coopersmith, 1987). According to Ruth Wylie (1961), numerous studies reveal that persons who seek psychological help frequently acknowledge that they suffer from feelings of inadequacy and unworthiness. Stanley Coopersmith, in his development of the Self-Esteem Inventory (SEI) found clinical studies repeatedly demonstrate that personal failures and other conditions which threaten to expose inadequacies in oneself are probably the major cause of anxiety. Further, there appears to be some indication that domination, rejection, and severe punishment of children result in lowered self-esteem (Coopersmith, p. 4). The term "self-esteem" may be defined as "pride in oneself" (American Heritage, 1985), or "belief in oneself and/or self respect" (Webster, 1965). Coopersmith found that sometime preceding "middle childhood", a person arrives at a general appraisal of his or her worth, which remains relatively stable and enduring over a period of several years. "This appraisal can presumably be affected by specific incidents or by environmental changes but apparently it reverts to its customary level when conditions resume their normal and typical course" (Coopersmith, p.5).

There have been numerous educational programs specifically designed to impact upon self-esteem of young children. The Las Vegas In-school 4-H program conducted by Nevada Cooperative Extension is one such program. From 1984 to 1988, the annual program offering to students participating in the Las Vegas In-school 4-H program consisted of more than twenty individual educational programs related to numerous special topics. These programs, varying in length from one-to-two hours, were offered to students in grades three through six. Brochures describing program content were distributed throughout the school system and teachers wishing to participate in the programs contacted the 4-H office to make arrangements for county 4-H instructors to deliver the programs in the teachers' classrooms. Four-H instructors delivered educational programs to approximately 28 to 30 thousand public school students, annually.

Program content focused on numerous related topics. Personal hygiene, nutrition, self esteem, money management, safety, agriculture, and science, are representative of those topics presented. Each program was planned and educational materials were developed by experienced instructors. All programs employed the use of standardized lesson plans and traditional educational program delivery methods. Most of the programs used "hands-on" visuals and appropriate "games" or other materials to stimulate student interest.

PURPOSE AND OBJECTIVES

The purpose of the study was to explore the relationship of student participation in a comprehensive in-school 4-H program with student scores on the four sub-scales of the Coopersmith Self-Esteem Inventory (SEI). In order to fully explain this relationship, secondary (moderating) variables included in the study were, student grade-level, gender, and scores on the lie scale developed by Coopersmith.[1]

PROCEDURES

As is found in many such evaluation studies, the program which was evaluated was already in operation. Therefore, the design had to limit the threats to validity of the findings without seriously impacting upon program delivery. The design was selected for use in an *ex post facto* study. It employed random sampling but not random assignment. The Static Group Comparison design as described in Campbell and Stanley's Experimental and Quasi-Experimental Designs for Research (1966, p. 12) was used in the study. Although the use of this design didn't rule out all threats to validity, it assisted in ruling out the more common threats of history, maturation, testing, instrumentation, and regression. Additional analysis of data could rule out additional potential threats to validity.

Data were collected from 543 randomly selected students in grades four through six of the Las Vegas school system.[2] Since it was necessary that students "self-report" participation in the various 4-H programs, a concern existed that they may not be able to accurately recall this important information. To improve in the accuracy of gathering these data, a slide-set and audio-tape were developed by 4-H staff to help students recall participation. Students watched the slides which described highlights of each program, and listen to a narrator describe each program and remind them of the types of information covered and types of materials they received. At an appropriate time, the narrator asked students to circle YES on a questionnaire if they remembered participating in the program and NO if they did not.[3]

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[1] The effects of gender and grade-level were included in the model to study their possible interactive effects with participation in 4-H Programs. Their main effects are of little importance to the findings. The lie scale scores were built into the model as a means of more conservatively studying the effects of participation. The Coopersmith instrument has a high amount of "face validity". Early research with the instrument indicated that some respondents tend to score higher than would be expected because of apparent "defensiveness" in their character. This sub-scale was used to more conservatively estimate self-esteem for those respondents.

[2] Total sample size for this study was slightly greater than 3,000 students. In it's entirety, the project was designed to evaluate the effectiveness of the in-school 4-H program regarding it's ability to increase self-esteem, improve students' attitudes toward school, and increase their knowledge of specific life skills. Data presented in this paper relate only to those students who participated in the self-esteem study.

[3] To study the accuracy of this reporting strategy, a small sample of students was selected for pilot-testing. They were asked to complete the survey and provide the names of their teachers for the past three years. The responses were then checked against records kept in the 4-H office. Based upon the cross-validation of these data, it was determined that students were accurately reporting participation eight out of ten times. (This was considered an acceptable margin of error for the study.) The self-reporting survey was developed into a "cover-sheet" which was then added to the front of the self-esteem inventory. The slide-tape program was then used as part of the test administration process.

A team of seven faculty members administered the tests to students over a one-and-a-half week period in November of 1988. The area 4-H administrator contacted all schools and coordinated visitation. All test administrators met on the evening prior to data collection and were trained in the administration process. In order to avoid threats to validity associated with administrator bias, each administrator was provided a written script to use when explaining directions. Each administrator was given a slide-tape program and practiced the administration prior to actually going to the schools. They were also asked to make notes regarding any "unusual" interruptions or activities which may have taken place during test administration.[4]

Test administration proceeded relatively "uneventfully". Minor problems were discussed each evening when administrators returned to the 4-H office. Some minor revisions were made to the directions script after the first day, to clarify directions given to younger students but few problems were noted by administrators. The data collection process took approximately one hour for each classroom.

ANALYSIS OF DATA

Data from each student questionnaire were coded and entered into a row-by-column data matrix which was analyzed using the $SPSS_x$ (Release 2.0) mainframe computer software available at the University of Nevada Computing Center. Cronbach's Alpha coefficients were calculated for each sub-scale in the SEI. Analysis of variance procedures were used to study potential threats to the validity of the study. Multiple regression models were developed to study the relationship between participation levels in the 4-H in-school program, several moderating variables, and scores on the four sub-scales of the SEI.

RESULTS

Of the 543 students who completed the self-esteem inventory, 54 percent were male and 46 percent were female. Sample size, by grade-level, was 162, 178, and 203 for grades four, five, and six, respectively. Individual student participation in 4-H programs varied from no participation (n=94) to 21 participations (n=3). The average number of programs students participated in was 6.1.

POTENTIAL THREATS TO VALIDITY

Prior to reporting results, each sub-scale in the inventory was analyzed for internal consistency. Cronbach's Alpha Coefficient was calculated for each of the sub-scales. Coefficients for each ranged from .61 to .89 (averaging .75) prior to modification. However, all items which were detracting from the internal consistency of the sub-scales were deleted prior to final analysis.

Analysis of variance was employed to study the possible threat of administrator bias. Any differences in scores on the various sub-scales which could be attributed to the main effects of the test administrator would indicate that bias was present. Although some differences existed in average scores among administrators, there appeared to be no pattern in these differences. (ie. The differences did not exist across all four sub-scales. Since all sub-scales were administered on the same instrument at the same time, any difference attributable to administrator bias should appear in at least more than one score. Since this was not the case, administrator bias was not considered as a possible cause of differing scores.)

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[4] Such interruptions as public address announcements, classroom visitors, etc. were analyzed to study their effects upon student scores. Coding procedures provided that each test could be traced back to who administered it, on what day, in what classroom, at what school, and whether any unusual circumstances were noted during the administration.

A study of the differences in scores across classrooms and the anecdotal notes provided by administrators also failed to produce any evidence of differences in scores related to interruptions or other intervening circumstances during administration. There was one exception however: some anecdotal notes from administrators suggested that some classroom teachers assisted students in completing their tests. Since the original sample was adequately large, these test data were dropped from the study prior to analysis to avoid possible contamination.

Finally, the testing instrument itself, was studied to determine readability. Although a criterium for selecting the original instrument was that it be written for interpretation at or below appropriate grade-level, the addition of the coversheet and some extra written directions would have changed the readability. Several readability tests were calculated by a reading specialist. The Fry Test was used in final analysis since it is most conservative at lower grade-levels (Dr. Mary F. Havercamp, reading specialist, personal communications, January, 1989). The instrument used in this study was determined to be at fourth grade reading level.

SELF-ESTEEM AND PARTICIPATION IN 4-H PROGRAMS

The four sub-scales of self-esteem developed in the Coopersmith instrument are: "Social Self-Peers", "Home-Parents", "School-Academic", and "General Self". As implied in each sub-scale name, self-esteem is measured in multiple ways. Items in each sub-scale relate to how the respondents view themselves with regard to social interaction with peers, home-life and parents, school and academic surroundings, and their general perceptions of themselves.

Multiple regression models were developed to study the effects of participation upon scores on the four self-esteem sub-scales. Scores on the lie scale, participation in 4-H, gender, grade-level, and the first-order interactive effects between each independent variable were included in the model for analysis.

The first model studied explained variance in the Home-Parent sub-scale. The home parent sub-scale was reduced from its original eight items to seven items in order to maximize the internal consistency of the measure. Cronbach's Alpha coefficient for the seven-item sub-scale was .69. Scores on the sub-scale could range from 0-7. Gender, participation, grade-level, scores on the lie scale, and their first-order interactions accounted for approximately six percent of explained variance in the sub-scale scores ($R = .255$ $df = 14, 528$ $p. = .0011$). However, since all variables in the equation were not significantly related to sub-scale scores, step-wise reduction of the model resulted in grade-level, participation, scores on the lie scale, and the first order interactions between participation and the lie scale scores, and grade-level and participation, still explaining approximately six percent of the variance in the

Table 1 The relationship of grade level, participation in 4-H programs, scores on the lie scale, the first order interaction between participation and the lie scale, and the first order interaction between grade level and participation with scores on the home-parent self-esteem sub-scale.

Variable	b	Beta	Zero Order Correlation Coefficient	Partial Correlation Coefficient	t	sig
Grade Level D1	.020	.005	.013	.003	.067	.947
Grade Level D2	.634	.160	-.001	.093	2.156	.032
Participation Level	.047	-.131	-.046	-.051	-1.185	.236
Lie Scale	.077	.072	.175	.046	1.072	.284
Participation Level x Lie Scale	.018	.239	.071	.088	2.046	.041
Participation Level x Grade Level D1	.014	-.030	-.016	-.016	-.373	.709
Participation Level x Grade Level D2	-.100	-.239	-.091	-.119	-.373	.006
(Constant)	4.481				14.375	>.0001

Multiple R = .237
Multiple R^2 = .056
Adjusted R^2 = .044
df = 7, 535

sub-scale scores (R =.237 df = 7, 535 p.= .0001). As indicated in Table 1, the effect of participation in 4-H programs is minimal. However, it is positive and significant in both interactive relationships. Table 2 describes the interactive relationship of grade level and participation in 4-H programs when controlling for the scores on the lie scale. Based upon these data one would predict a slight increase in self esteem when there was an increase in exposure to 4-H programming for fourth and sixth grade students. However, the relationship between program participation and scores on the sub-scale was reversed for fifth grade students.

Table 2 The interactive relationship of grade level and participation in 4-H programs to scores on the home-parent self-esteem sub-scale when controlling for scores on the lie scale.

	Participation Level (# of programs)				
Grade Level	0	5	10	15	20
4	4.772	4.784	4.796	4.808	4.820
5	5.386	4.968	4.550	4.132	3.714
6	4.752	4.834	4.916	4.998	5.080

$F_{interaction}$ = 4.519 df = 2, 535 p. = .011

The next model studied explained variance in the Self-Peer sub-scale. The Self-Peer sub-scale was reduced from its original eight items to six items in order to maximize the internal consistency of the measure. Cronbach's Alpha coefficient for the six-item scale was .63. Scale values could range from 0-6. A similar regression model was constructed for this analysis and all independent variables entered into the equation explained a total of 13 percent of the variance in the scores (R = .354 df = 14, 528 p. < .0001). A similar step-wise reduction of the model as in that used in analysis of the home-parent sub-scale resulted in the main effects of gender and scores on the lie scale remaining in the equation and accounting for slightly less than 11 percent of the variance in self-esteem scores. It should be noted that although not significant at the

Table 3 The relationship of gender, participation in 4-H programs, and scores on the lie scale to scores on the self-peer self-esteem sub-scale.

Variable	b	Beta	Zero Order Correlation Coefficient	Partial Correlation Coefficient	t	sig
Gender	.271	.085	.100	.090	2.087	.037
Lie Scale	.281	.306	.315	.308	7.511	>.001
Participation Level	.023	.075	.100	.079	1.830	.068
(Constant)	2.812				16.600	>.0001

Multiple R = .335
Multiple R^2 = .112
Adjusted R^2 = .110
df = 3, 539

commonly used .05 level, the participation variable approached significance in the model (p. = .068). As indicated in Table 3, when left in the regression model, the main effects of gender, scores on the lie scale, and participation explained slightly more than 11 percent of the variance in scores (R = .335 df = 3, 539 p. < .0001). Girls scored higher on the scale than boys. An increase in lie scale scores resulted in an increase in self-esteem scores, and, as indicated in Table 4, although only approaching significance, an increase in participation in 4-H also lead to increases in self-esteem.[5]

Table 4 The relationship of participation in 4-H programs to scores on the self-peer self-esteem sub-scale when controlling for the main effects of gender, and scores on the lie scale.

Participation Level (# of programs)	Score
20	4.387
15	4.272
10	4.157
5	4.042
0	3.927

$F_{participation}$ = 3.350 df = 1, 539 p = .068

The remaining sub-scales (School and Academic sub-scale and the General sub-scale) were analyzed in the same manner as described above. However, the main or interactive effects of participation in 4-H programs did not significantly relate to scores on either of these scales. Gender and scores on the lie scale explained approximately seven percent of the variance in the School and Academic sub-scale (R = .267 df = 2, 540 p. > .0001). Girls scored higher on the scale than boys, and as one would have predicted, those scoring higher on the lie scale also scored higher on the School and Academic sub-scale. For the General sub-scale, grade level and scores on the lie scale accounted for approximately 11 percent of the variance (R = .328 df = 3, 539 p. > .0001). Fourth grade students scored higher than fifth grade students and fifth grade students scored higher than sixth grade students on the General self-esteem sub-scale. Again, students scoring higher on the lie scale also scored higher on the General sub-scale.

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[5] This information is provided to the reader due to the "exploratory" nature of the study being conducted. Admittedly, participation should not have been left in the model when using normal quantitative procedures. However, it is the opinion of the researchers that it merits further study, based upon these results.

CONCLUSIONS AND/OR RECOMMENDATIONS

The purpose of this study was to explore the relationship of participation in 4-H programs and scores on Coopersmith's SEI. Based upon the findings, it is evident that participation in the programs is, in some cases, significantly related to self-esteem. However, the relationship is minimal, at best. Although this would outwardly appear to be "disappointing" to 4-H program planners, it does not rule out the fact that 4-H is positively affecting those who participate in the programs. The relationship existed even though considerable effort was invoked to rule out alternative causes for increases in SEI scores. The literature indicates that there is little reason to believe that specific "environmental changes" have lasting impact upon self-esteem. Based upon this study, it appears that these 4-H programs which students have been exposed to over a three year period, may have some "limited" lasting impact.

Following are the important conclusions and considerations for further study.

1. There is a significant interactive relationship between grade level, participation in 4-H programs, and scores on the Home-Parent self-esteem sub-scale. Both fourth grade students and sixth grade students experienced a slight increase in self-esteem as the number of 4-H participations increased. Further, participation in 4-H programs approached significance in its relationship to scores on the Self-Peer sub-scale. However, further substantiation of these relationships will be necessary before one can conclude that participation in the program is indeed positively affecting self-esteem. This hypothesis would become more plausible only after replication of the study produced similar evidence.

2. It is not immediately apparent as to why the fifth grade students would be predicted to show a slight decrease in scores on the Home-Parent sub-scale as their contact with the 4-H program increased. The only obvious difference in this group and the other two groups of students is related to the organizational structure of the school system itself. Students in grades one-through-five are housed in elementary schools in the Las Vegas School System. After fifth grade, students are bussed to "sixth grade centers" for one year and then to middle schools for grades seven, eight, and nine, before entering high schools for the remainder of their education. During discussions with teachers in Las Vegas, some indicated that the "oldest" students in each of these school structures appeared to be somewhat different with regard to behavior. That is, fifth graders, ninth graders, and seniors, being the oldest in their respective schools, were somewhat different in their demeanor. Coopersmith indicated that any number of "specific incidents" or "environmental changes" can have temporary effect upon self-esteem. Perhaps fifth graders simply perceive themselves differently, being the oldest in the elementary schools. However, there is still no logical explanation as to why this might reverse the relationship between participation in 4-H programs and scores on this sub-scale. Further study of this phenomenon is also recommended.

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A STUDY OF THE RELATIONSHIP OF PARTICIPATION IN IN-SCHOOL 4-H AND SELF-ESTEEM FOR STUDENTS IN THE LAS VEGAS SCHOOL SYSTEM

A Critique

Michael F. Burnett, Louisiana State University--Discussant

The researchers are commended for addressing a very important topic in the field of Agricultural Education. The purpose of the study is clear and appropriately stated. In addition, the design of the study is clearly defined, and appropriate data analysis techniques are selected and clearly reported.

The researchers were especially thorough in their attempts to eliminate the threat to the internal validity of identified potential extraneous variables. An in-depth description is provided of the attempts to verify the accuracy of student self reported data. In addition, the researchers made extensive efforts to identify problems which may have occurred during data collection. These threats included administrator bias, classroom effects (intrasession history), and instrument readability.

Questions which were identified as the paper was being reviewed include:

What was the sampling technique used in the study? The researchers state that random sampling was used, but no indication was given regarding the specific sampling technique utilized. One might logically surmise that a cluster sampling procedure was used.

What procedure was used to establish the content validity of the researcher developed instrument? Was the project staff relied upon to establish the validity of the instrument or was an external panel employed?

The researchers report that, "All items which were detracting from the internal consistency of the sub-scales were deleted prior to final analysis." What was the rationale and/or justification for this procedure? It seems to this reviewer that since the sub-scales of Coopersmith's Self-Esteem Inventory are components of a standardized instrument, elimination of items from these sub-scales would be inappropriate. The question might be raised that if items are eliminated from a sub-scale, is it still adequately measuring what it was intended to measure? Perhaps other factors were impacting on the internal consistency of the scales such as the diversity of the subjects included in the study (grades 4 through 6). This is identified by the researchers as a confounding variable.

Were there specific recommendations that could have been derived from the study? This section of the research report seemed especially weak to this reviewer since virtually no specific recommendations were presented. It would seem that at least recommendations for further research beyond replication of this study could be derived from these results.

Keynote Address for
1990 NAERM

FOCUSING AGRICULTURAL EDUCATION RESEARCH: STRATEGIES FOR THE PROFESSOR*

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INTRODUCTION

Universities are in a period of transition driven by profound changes in society. "Strategic planning" is a common term used on many campuses to describe an ongoing process of program evaluation and refinement. Colleges of agriculture and education, the home of most agricultural education programs, are identifying priorities and clarifying missions. To provide a basis for decision-making and resource allocation, mechanisms are being installed to monitor the status and progress of academic programs.

Periods of transition provide agricultural education units in higher education the opportunity to define the unique contributions they make or could make to the mission of the institution and to explore changes that would maximize productivity of the faculty. Transition is also a time for professors to prioritize their work.

This paper concerns agricultural education research from the faculty perspective. Ten action steps or strategies are discussed to aid agricultural education professors in focusing their research. These strategies are: (1) understanding their discipline, (2) knowing their position, (3) reviewing priorities, (4) creating new knowledge, (5) developing a research program, (6) building the program on a sound theoretical base, (7) learning from other experienced researchers, (8) assigning credit and responsibility, (9) marketing their findings, and (10) evaluating their research program.

UNDERSTANDING THEIR DISCIPLINE

Professors must be thoroughly acquainted with their disciplines before attempting to make a contribution to knowledge through research. Agricultural education is a young discipline. It evolved from the scientific disciplines of (1) agriculture whose roots are in the biological and physical sciences, and (2) education whose roots are in psychology and sociology (Barrick, 1988). Barrick (1988, p. 5) defined agricultural education as "the scientific study of the principles and methods of teaching and learning as they pertain to agriculture." Williams (1990) has made a number of observations regarding the salient characteristics of agricultural education:

> Agricultural education applies technologies and theories from the biological and physical sciences, psychology, and sociology.
> Agriculture and education form the foundation for agricultural education.
> Agricultural education bridges the two, focusing on the principles and methods of teaching and learning about agricultural science and technology.
> The general processes used in agricultural education to apply teaching and learning are: (1) curriculum planning, (2) delivery methodologies, and (3) program evaluation.

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Application settings for agricultural education include universities, secondary and vocational schools, extension, industry, and agencies.

KNOWING THEIR POSITION

Changes in universities, particularly in land-grant universities, away from the predominance of traditional classroom teaching into research and extension have altered the work environment of agricultural education professors. MacKenzie and Koonce (1987, p. 1) state that "today's university is very much committed to research and service, and sometimes it seems almost at the expense of classroom teaching." New performance criteria are challenging professors accustomed to assignments in teaching and service to include a research component in their work. The position descriptions of tenured faculty should be reviewed and revised to include a research component. New position descriptions commonly define a research focus already identified as a priority of the department or college. These changes provide an opportunity for agricultural education units and professors to focus their research programs.

A criterion given considerable weight in evaluating research is its direction or focus. "To appear unfocused or without direction in . . . research is not good. This oftentimes requires the ability to resist the attractions of 'one more project' or the fortitude to say no to 'one more invitation to participate.' To be good at a few activities is better than to be poor at many activities" (MacKenzie and Koonce, 1987, p. 6).

Creative efforts in agricultural education can take many forms although the university may not consider all of equal importance. As a criterion of productivity, research producing refereed publications is the norm in many universities. "Very rarely will a university disclose the expected number of publications per year, but a general rule of thumb is that an average of two per year is pretty good" (MacKenzie and Koonce, 1987, pp 5-6). Professors hoping to advance in the academic community should ask themselves and their superiors "What is expected of my research program?" and "How will my productivity be measured?"

REVIEWING PRIORITIES

As stated earlier, agricultural education bridges agriculture and education. Thus, in focusing a research program, professors of agricultural education can ask themselves several questions related to state, national, and international priorities:

> "In which area of agriculture do I have the greatest interest or expertise?" In answering this question, consideration should be given to the latest national priorities for food and agricultural sciences, e.g. water quality, biotechnology application, food safety, and expanded uses for agricultural products (Joint Council on Food and Agriculture Sciences, 1989).
>
> "In which area of education do I have the greatest interest or expertise?" Consideration should be given to new educational developments in curriculum planning, delivery methodologies, and program evaluation, e.g. issue or principle approach to curriculum development, teaching methods for distance learning, and impact evaluation.
>
> "Which application setting should I target - - university, secondary and vocational schools, extension, industry, or agencies?"

"What are the agricultural and educational priorities in my state and at my university?"

"What are the national priorities for agricultural education research?" These priorities were identified by Buriak and Shinn (1989) and Silva-Guerrero and Sutphin (1990).

"Is there a possibility of forming (or joining) a team of researchers (perhaps multidisciplinary in nature) in a priority area to enhance the scope and impact of my research program?"

"Is there a possibility for forming a partnership with agencies or industry to accomplish mutual goals and to consolidate resources?"

"Is an international dimension possible to develop cross-cultural linkages?

CREATING NEW KNOWLEDGE

A dictionary definition of research is "careful, systematic study and investigation in some field of knowledge" (Webster's New World Dictionary, 1990). Borg and Gall (1989, p. 15) described the purpose of research as the "discovery of new knowledge about teaching, learning, administration, and other educational phenomena." Much of the research in agricultural education focuses on understanding the processes of curriculum planning, delivery methodologies, and program evaluation as applied in various educational settings (schools, university, extension, and agencies), with the goal of developing knowledge useful to agricultural educators. The scientific method, which includes formulating hypotheses, deducing their consequences, and testing them empirically provides a systematic approach to generating new knowledge. Research should not be viewed as a routine process, but as a means of producing new knowledge. Moments of scientific discovery can be among the most exciting experiences of a researcher's life.

DEVELOPING A RESEARCH PROGRAM

A research program is much more than maintaining a list of research publications. In fact, it affects all aspects of faculty work. A research program can be used as a tool for planning a career, establishing priorities, and setting goals for scholarly development and productivity.

A research program should define a small element of the discipline in which new knowledge is sought. Faculty should establish their areas of specialization within the discipline and create a base for teaching and service activities through their research. Scholarship is maximized when the research, teaching, and service (extension) of individual faculty have the same focus. The development of a research program may begin in graduate school with the selection of a thesis or dissertation problem and continue throughout the individual's career. The development of a research program making a significant contribution to a discipline may take a lifetime.

In addition to a sound base of publications, research programs should yield complementary activities. Such activities may include

identification of a specialization in the discipline,
applications for and receipt of grants and contracts,
titles and summaries of individual research projects,
collaborative efforts,

invited seminars and papers,
assistance with other research projects,
awards and honors,
courses revised and taught based on research,
service (extension) activities to disseminate research findings,
curricular and instructional materials developed based on research findings,
articles in popular or professional magazines, and
work in professional organizations related to specialization.

BUILDING THE PROGRAMS ON A SOUND THEORETICAL BASE

To advance scientific knowledge, professors must identify, study, and evaluate research already done in fields of interest. Successful researchers are aware of the inroads that theory can make into scientific research. Much effort must be put forth to determine the frontier of knowledge in a defined area. Professors must first learn what others have done and what remains to be done in an area before attempting to expand knowledge. "Scientists build on previous results because it is not practical (or necessary) to reconstruct all the observations and theoretical constructs that go into an investigation" (National Academy Press, 1989, p. 11). Borg and Gall (1989, p. 116) state that "the literature in any field forms the foundation upon which future work must be built." But the literature base for agricultural education research should not be limited to other agricultural education studies. Rather, it should be grounded in relevant biological, physical, and social sciences in addition to the disciplines of agriculture and education. The use of appropriate research designs, data-collection techniques, and statistical treatment of data will not make up for a sketchy and shallow synthesis of existing knowledge. A weak theoretical base for a research program leaves the door open for a "lack of focus" indictment. "Mistakes made while trying to do one's best are tolerated in science; mistakes made through negligent work are not" (National Academy Press, 1989, p. 14).

LEARNING FROM OTHER EXPERIENCED RESEARCHERS

Graduate courses in universities provide a means for young researchers to learn the methods and values of scientific research. Personal contact and interaction with more experienced researchers remain, however, the best ways to develop and refine the process of generating scientific knowledge. For this reason, M.S. and Ph.D. candidates have major professors. Frank Press, president of the National Academy of Sciences, described this aspect of a scientific education as follows: "Any beginning researcher who does not work closely with an experienced scientist is missing one of the most important aspects of a scientific education. Similarly, any experienced researcher who does not pass on to younger scientists a sense of the methods and norms of science is significantly diminishing his or her contribution to the field's progress" (National Academy Press, 1989, p. v.).

Basic research methods such as designing experiments and statistical treatment of data can be learned from books and classes. "But many methods are learned only through personal experience and interaction with other scientists. . . many of the intangible influences on scientific discovery - - curiosity, intuition, creativity - - largely defy rational analysis, yet they are among the tools that scientists bring to their work" (National Academy Press, 1989, p. 6).

Graduate education should be only the beginning of the research team idea. Williams (1990, p. 7) advocated that "programmatic research initiatives . . . demand resources and expertise beyond those that can be provided by a sole researcher."

> Effective research teams of the future will include scientists from outside of agricultural education, technicians and graduate students inside and outside of the discipline and will frequently cross state and national boundaries. Multidisciplinary approaches will be needed to solve many of the research problem areas identified.

Collaborative research can broaden scientific perspectives and advance research far beyond what might have been accomplished otherwise (National Academy Press, 1989).

ASSIGNING CREDIT AND RESPONSIBILITY

In scholarly publications, credit for research is acknowledged in a list of authors and in a list of references. Conflict over proper credit can arise in both places. Researchers have an ethical and professional obligation to give others the credit they deserve.

To avoid later difficulties, research teams, including graduate students and their major professors, should discuss the authoring of published papers early in the process. Omitting names from the list of authors or simply ordering them can create conflicts among researchers. Proper listing of authors is important because it not only gives credit but also assign responsibility for the contents of the paper (National Academy Press (1989). "Well-established scientists may decide to list their names after those of more junior colleagues, reasoning that the younger scientists thereby receive a greater boost in reputation than they would if the order were reversed" (National Academy Press, 1989, p. 17).

Accuracy in citations and in the reference section is also important. Frequent errors in these areas reflect unfavorably upon the scholarship of a researcher (Borg and Gall, 1989). Citations serve several purposes in a research paper. They acknowledge the work of others, direct the reader towards additional sources of information, acknowledge conflicts with other results, and provide support for the views expressed in the paper. More broadly, citations relate the paper to the present state of scientific knowledge and provide a paper trial for later researchers to follow (National Academy Press, 1989).

It is equally important for professors to credit appropriate units within the university. Most universities have procedures for submitting papers to scientific and professional journals and meetings. This approval process may include an accountability element recording the number of papers submitted and accepted for publication. Agriculture experiment stations commonly provide this and similar services that can help faculty develop their research programs.

MARKETING THEIR FINDINGS

Professors have to make decisions not only about the focus and methods of their research program but also about marketing strategies. Research is of limited value unless the findings are made available to other researchers and practitioners.

A marketing strategy should include both informal and formal mechanisms for sharing research findings. Before being released to a broader audience, research observations should be shared with colleagues and supervisors in hallways and over the telephone and through presentations at local seminars and conferences. Thus, refinements can be made before results are submitted to scientific journals.

Whereas publishing in peer-reviewed journals remains the standard means of disseminating scientific results to maximize the impact of research, other methods of communication should be considered. Research findings should be infused into the classes researchers teach and disseminated through their service, outreach, and extension activities. Presentations at professional meetings; individual meetings with scholars, textbook authors, and curriculum writers; and seminars given at other universities enhance the impact of research. "Discussion of scientific ideas in small groups in one of the many social processes that establish new observations and theories as publicly accepted scientific knowledge" (National Academy Press, 1989, p. 11).

University professors frequently feel the pressure to publish and are tempted to cut corners to compile a long list of publications. But sacrificing quality to such pressure is likely to have a detrimental effect on careers. The number of publications to an individual's name, though a factor in hiring and promotion, is not nearly as important as the quality of overall work (MacKenzie and Koonce, 1987). To have findings incorporated into the work of colleagues is one of the greatest rewards from research.

EVALUATING THEIR RESEARCH PROGRAM

Williams (1990) advocated that as a discipline matures it should move from an evaluation of the research process to an assessment of the impact made by the research. Likewise, research programs of individual professors should develop to the point that sound research methodology is a given and assessments made with regard to educational, agricultural, environmental, social and/or other impact.

Successful research programs have a built-in evaluation component, e.g. judgment by peers for publication and presentations, and citations in the literature. Self-assessment should also be a feature of research programs. The strength of the self-judgment can be tested by comparing conclusions to those of peers. Questions agricultural education professors should ask in a self-evaluation of their research program include the following:

"Are the classes I teach laced with my research findings?"
"Are the results of my research disseminated through my service, outreach, and extension activities?"
"Has my research been published in refereed journals?"
"Have I shared my findings with teachers, extension personnel or other user groups?"
"Have I presented my research at professional meetings?"
"Have I shared my findings with textbook authors and curriculum writers in the discipline?"
"Have I met with other researchers to discuss my observations?"
"Have I tied my findings to the work of others for the advancement of knowledge?"
"Have I explored the implications of my findings for curriculum planning, delivery methodologies, and program evaluation?"
"Has my work been funded by external sources to expand my research and development initiatives?"
"Has my research been cited by others?"

SUMMARY

The changing environment existing on university campuses provides an opportunity for agricultural education professors to develop and expand their research programs. Agricultural education professors should consider themselves scholars dedicated to creating and sharing new knowledge. Research programs can be focused via a continuous process enhanced by careful and systematic planning. This process includes (1) understanding the discipline, (2) knowing their position, (3) reviewing priorities, (4) creating new knowledge, (5) developing a research program, (6) building the program on a sound theoretical base, (7) learning from other experienced researchers, (8) assigning credit and responsibility, (9) marketing their findings, and (10) evaluating their research program.

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Alternate Papers

Selected for Inclusion in the Proceedings

FACTORS WHICH INFLUENCE PARTICIPATION AND NON-PARTICIPATION OF ETHNIC MINORITY YOUTH IN OHIO 4-H

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INTRODUCTION

The 4-H program is one of the oldest educational efforts in the United States. As an entity of the Cooperative Extension Service and the United States Department of Agriculture, 4-H has existed in part, to help young people become mature, competent adults. The Ohio 4-H program, much the same as 4-H programs in other states, shares the same goal. With the program emphasis on youth, an indication seems to exist that all youth are served. However, an in depth look at the number of ethnic minority youth who are served by 4-H programs raises the question regarding efforts and strategies utilized to make 4-H programs accessible to all populations.

An Evaluation of the Economic and Social Consequences of Cooperative Extension Programs published by the United States Department of Agriculture (1980) cited problems related to serving minority youth populations:

> The definition of the target population as "all youth ages 9 to 19" ignores the differential effects of 4-H educational treatments. This has led to the development, albeit unconsciously, of the institutional, economic, and racial discrimination pattern. 4-H professionals have not learned how to relate the most effective dimensions of the 4-H experience to the needs of minorities and the disadvantaged (page 125).

Emerging demographic trends impact the 4-H program as a component of the broader organization, the Cooperative Extension Service. Indeed all of the components of the Cooperative Extension Service face the challenge of becoming responsive to an increasing ethnically diverse population. A report from the Extension Committee on Organization and Policy, "Addressing Diversity in the 1990's and Beyond: CES Can Make a Difference," (July, 1990) emphasized the opportunities facing the organization to reach new and diverse audiences:

> The Task Force on Diverse Audiences has recognized growing needs for the Cooperative Extension System. Yet there is a powerful awareness that the economic, social, and political forces related to a rapidly expanding diverse population will have important effects on the future of the System. The ability of CES to play a pivotal role in meeting educational needs in the future is dependent upon its ability to expand its programs to access both diverse and traditional audiences, and its capacity to reflect diversity at all levels of the System.

Effectively addressing ethnic diversity is a critical concern of the Cooperative Extension System. Ohio 4-H, as a vital link in the system of the Ohio Cooperative Extension Service, might therefore be expected to implement new solutions to serving diverse audiences with its educational programs.

Ohio 4-H served over 151,000 youth during 1988 (Ohio Cooperative Extension Service, 1989). Of this total, approximately 12 percent were African American (60 percent of which were located in two Ohio counties), .05 percent were American Indian, .50 percent were Hispanic, and .40 percent were Asian Americans (Ohio Cooperative Extension Service, 1989).

The demographic data for Ohio indicates that the population is approximately 12 percent African American (18% in the two counties referred to earlier as serving 60% of the African American 4-H youth), .50 American Indian, 1.5% Hispanic, and 2.3% Asian American (United States Bureau of Census, 1989). Although the evidence has indicated that Ohio 4-H is attempting to serve ethnic minority youth, there is also evidence that Ohio 4-H is not serving these youth proportionately throughout the state.

The increasing number of ethnic minority youth provide a significant pool of potential members for inclusion in Ohio 4-H programs. Minority youth comprise approximately one-third of the youth in America (The Commission on Minority Participation in Education and American Life, 1988). The number of minority youth has increased at a faster rate than white youth (Banks, 1987). In 1987, 17.8% of youth in America age 5-17 were white while 23.6% were African American (United States Bureau of Census, 1988).

PURPOSES AND OBJECTIVES

The purpose of this study was to explore factors associated with participation and non-participation of ethnic minority youth in the Ohio 4-H program. The study also sought to identify the perception of minority parents regarding their childrens' participation and non-participation in Ohio 4-H.

The specific objectives of the study were to:

1. determine those factors which were perceived by ethnic minority youth as positive influences for participating in the Ohio 4-H program.
2. determine those factors which were perceived by ethnic minority youth as barriers to participation in the Ohio 4-H program.
3. determine those factors which were perceived by the parents of ethnic minority youth as positive influences for their childrens' participation in the Ohio 4-H program.
4. determine those factors which were perceived by the parents of ethnic minority youth as barriers to their childrens' participation in the Ohio 4-H program.

PROCEDURES

POPULATION AND SAMPLE

The population for this study consisted of ethnic minority youth and the parents of the ethnic minority youth in ten purposefully selected counties. The counties selected were those which had the highest percentage of ethnic minority youth served and the lowest percentage of ethnic minority youth served in each of the five Ohio extension districts.

Data from 1988 Extension 4-H enrollment figures (Ohio Cooperative Extension Service, 1989) were utilized to select counties. The following counties (cities) were selected: Hamilton (Cincinnati), Clermont (Batavia), Scioto (Portsmouth), Highland (Hillsboro), Muskingum (Zanesville), Coshocton (Coshocton), Lucas (Toledo), Hancock (Findley), Cuyahoga (Cleveland), and Geauga (Burton). Two of the selected counties (Clermont and Geauga) were unable to participate because there were no minority youth enrolled in 4-H programs at the time the data was collected.

Youth involved in this study (n = 58) were current members of the Ohio 4-H program. Parents of ethnic minority enrollees (members of an Ohio 4-H program) made up the parent population (n = 44). The accessible population of ethnic minority youth and parents in the eight participating counties were contacted through lists produced by the county extension agents in each respective county.

INSTRUMENTATION

Focus group interviews were conducted in eight Ohio counties between February and May, 1990. Questions were developed for interviewing youth and parents. The questions for both youth and parents focused on influences and barriers to participation in the 4-H program.

The questions to determine appropriate content, structure, and face validity were reviewed by a panel of experts consisting of faculty from an Agricultural Education department, state level extension personnel, county extension personnel, and minority community leaders. The questions were revised to reflect suggested recommendations from the panel of experts.

DATA COLLECTION

The researchers traveled to the selected counties to conduct the focus group interviews in locations selected by county 4-H agents. Youth and parents had been notified of the meeting through a personal letter and a personal phone call from the researchers. In addition, the county extension agent countersigned the letter with the researchers. All the parent interviews were conducted by one of the researchers while the other researcher interviewed all the youth to control for intra-rater reliability.

ANALYSIS OF DATA

The focus group interviews were audio taped for the purpose of analysis. The tapes were transcribed and the data sorted into responses based on the questions asked (influence or barrier to participation). Descriptive analysis was used to present issues, themes, and commonalities.

RESULTS

Focus group sessions were conducted in eight Ohio counties which included both urban and rural settings. While the majority of the youth and parents who attended the focus group sessions were African American, other ethnic minorities were represented including Hispanics, Phillipinos, and Asians. In regards to gender, both male and female youth participated in the sessions. The majority of adult participants were female, however, several males participated in the focus group sessions.

A summary of the focus group findings indicated several themes, issues, and commonalities repeatedly discussed by both youth and parents. The recurring discussions focused on the following issues: knowledge and perception of the 4-H program; factors that influenced youth to enroll in 4-H programs; factors that encouraged youth to remain in the 4-H program; projects and events that youth enjoyed most; factors that youth and parents particularly disliked; instances of discrimination; and, suggestions for advertising 4-H programs.

YOUTH FINDINGS

In general, minority youth found 4-H provided a positive experience. The youth indicated that many of the 4-H activities were meaningful and educational. At the local level, the awards and recognition program helped to build self-confidence and made the youth feel good about themselves. At the same time, local projects provided an opportunity for youth to utilize their time constructively which kept them off the street.

At the state level, the youth were not as positive about the awards and recognition system employed by 4-H. The youth indicated that the awards at the state level did not reflect their "projects." The youth further indicated that the emphasis of the 4-H award and recognition programs at the state level was oriented towards "animals and crops, and for those youth with money to spend on large projects."

Youth reported that they were most often influenced to join 4-H through a parent, a relative who served as an agent, assistant or leader, or a friend. Moreover, the youth remained in the 4-H program because they enjoyed the projects, activities, and events.

Some youth found 4-H to be a place to learn new things, have fun, and at the same time develop leadership skills. Others enjoyed camps, events, and trips. And, one Hispanic young man stated that he wanted to "prove that a minority could excel in 4-H."

Projects and events most frequently cited were food projects, sewing and style review, arts and crafts, 4-H speaking contests and demonstrations, and 4-H camp. Youth in one urban area were unusually interested in the speaking contests and demonstrations because of the leadership skills and self-confidence promoted by the events.

Urban youth also expressed a desire to learn more about farming and farm animals which were unaccessible to them and which in their opinion constituted the majority of the awards and recognitions to be earned at the state level. While a number of projects and events were discussed, it was evident that minority youth were unaware of all of the opportunities available through the 4-H program. The youth exhibited no knowledge of the programs offering competition for national and international trips and awards.

Youth perceived several factors as barriers to participation. Occasional conflict with another activity was a problem most frequently cited as a barrier to participation. Another barrier, which was often cited, was a general concern regarding the inequity of judging activities exhibited through criteria and procedures during events.

Urban youth were unable to participate in some activities that required farm animals, unavailable to them because of residence or cost. Yet, these activities were perceived as priority activities in judging events and award and recognition systems in 4-H. In addition, several youth expressed feelings of isolation and discrimination at state and local fairs, 4-H camp, or other 4-H events. The primary reason the youth believed the incidents of discrimination and isolation existed was because there were very few minorities present at 4-H events. And when the minority youth were present at these events, they are looked at as "being different."

PARENT FINDINGS

Parents expressed strong interest in the educational opportunities and activities provided through the 4-H program. Parents were pleased with the leadership skills developed by their children through 4-H. The parents perceived that 4-H activities helped their children to develop a sense of responsibility and self-worth while offering opportunities for youth to interact with other people.

Overall, 4-H was viewed as an organization that provides beneficial educational activities that encourage youth development while assisting them in making constructive use of their time. As a result, the parents were thankful that 4-H helped keep the youth off the streets and out of trouble.

Prior to being approached by an agent or leader, most minority parents had limited knowledge of the 4-H program. Many parents viewed the program as something for rural white kids that involved farm animals. Lack of advertising was cited as the major barrier to participation by the parents.

Furthermore, the parents concluded that the advertisements depicting 4-H programs did not generally include minority youth nor were the advertisements written for an urban setting. Also, the parents stated that the recruitment information was usually written so that minority youth and parents could not understand the information.

Also cited as a barrier to participation by the parents was a lack of adult role models involved in 4-H (agents, assistants, and leaders). The parents, however, quickly cited that many other minority parents could be recruited as volunteers if the county extension agent went into the community to recruit the parents.

Other barriers to participation cited by parents included lack of funds for projects and events which prohibited full participation by minority youth. Discrepancies in judging events were also mentioned. Parents at several focus group sessions discussed inconsistencies in judging at the state fair, inequitable treatment by other parents and leaders at the state fair, and the lack of interaction between minorities and whites at many 4-H events.

CONCLUSIONS AND/OR RECOMMENDATIONS

Based on themes and commonalities reported in this study, ethnic minority youth and parents found several positive influences for participation. The experiences, activities and opportunities for youth development were cited as positive influences for participation. The Cooperative Extension Service should continue to emphasize the aspects of youth development in its effort to recruit and retain minority youth.

Youth and parents cited the lack of role models as a barrier to participation. The presence of minority agents, assistants, and leaders served as a catalyst for getting youth involved and retaining them in the program. The Cooperative Extension Service should make a conscious effort to recruit minority agents and leaders in an effort to fulfill a void of necessary minority role models for minority youth. This is especially critical in urban areas where a higher percentage of minority children reside.

Since many minority parents and youth were unaware of the 4-H program, increased advertising through non-traditional methods would assist in better recruitment efforts. Advertising on minority radio stations, in minority newspapers, and perhaps through minority churches would make more youth and parents aware of the program. Advertising should adequately describe the dimensions of the program including the activities, events, and projects. Certainly the most effective advertising tool cited was the "personal touch." The increased effort in recruitment could be promoted by the youth and leaders already involved in the program.

The cost of participation (funds for project supplies, refreshments for meetings, camps, and traveling to events) was another factor of concern. Unique funding mechanisms and potential funding sources should be explored. Perhaps programs could be devised whereby youth could perform community work in exchange for funding for projects and activities.

Concern was noted by both youth and parents in the lack of equitable treatment and criteria for judging activities. Rural minority youth, but especially urban minority youth, discussed the inability to participate in many special projects (animal judging, crop production, agricultural mechanics) that were geared specifically for rural white youth.

The Cooperative Extension Service should make a critical analysis of the project judging procedures and guidelines for training judges to sensitize them toward fairness to all. White youth and parents must also become sensitized to the fact that the 4-H program is open to all individuals regardless of race or color. As more minority youth and leaders become involved, this transition must take place.

Certainly the Cooperative Extension Service should become aware of exposing minority youth to all dimensions of 4-H. Informing and encouraging youth to take necessary steps for competition for national and international trips and awards would move toward promoting full participation.

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AN ANALYSIS OF SELECTED MANAGEMENT SKILLS AND BEHAVIORS PERCEIVED TO BE LEARNED AND USED BY COOPERATIVE EXTENSION SERVICE PROFESSIONALS IN IOWA

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INTRODUCTION

The examination of job descriptions of Cooperative Extension staff in Iowa identified certain key words that were a part of each position description. Words such as coordinate, plan, lead, manage, organize, evaluate, supervise, implement, and decide are common to each job description. These key words are also words that are commonly used to describe management characteristics.

Whiteside and Bachtel (1987) identified the ten most important management skills needed by the county extension director as having the ability to communicate, lead, plan, make decision, budget, promote a good image, good public relations, evaluate, support staff and motivate others. The literature supports the idea that management is a part of the extension professional's job. Prawl, Medin, and Gross (1984) stated that in the broadest sense all extension faculty were managers. Whiteside and Bachtel (1987) considered managing limited resources to optimum efficiency and effectiveness as one of the greatest challenges facing extension's future. Buford (1979) believed that the possession of good management skills is one of the qualities essential to being a good extension worker, but also pointed out that is the most neglected area of study. Historically, extension professionals have been viewed as subject matter specialists or program leaders of one of the broad areas of agriculture, home economics, youth and community development with county staff being considered generalists (Sanders, 1966). There is a great deal of support for the idea that extension professionals possess good management skills and yet that is not one of the minimum job qualifications for extension professionals in Iowa. It is debatable as to whether management skills are inherent. A study by the Honeywell Corporation (1985) indicated that the skills are acquired through on the job experiences, job associated relationships, and through structured learning experiences.

Martin (1987) and Kruse (1986) identified the need to teach management skills to extension professionals in Iowa even though extension professionals, themselves, did not see the possession of traditional management skills as a necessary to being a competent professional in extension. As a result, a course in management skills for extension professionals was offered through the department of Agricultural Education at Iowa State University in 1987 and 1988. A literature search revealed there was very little information identifying management skills perceived to be important to extension professionals in Iowa. While Martin (1987, 1988) was teaching traditional management skills, reactionary evaluation data gathered in 1987 revealed that the course was well received, but did not identify those management skills that were perceived to be important to extension professionals in Iowa. There was also no follow up to indicate whether those skills that were taught by Martin were learned by the class participants.

PURPOSES AND OBJECTIVES

The purpose of this study was to assess the extent to which selected management skills and behaviors were performed as perceived by extension professionals in Iowa. The secondary purpose was to determine the extent to which these skills were perceived to be learned in a structured educational program and used in professional practice. Specific objectives were to identify the extent to which certain managerial skills were perceived to being used and to gather selected demographic data to describe the extension professionals in Iowa. Additional objectives were to determine relationships of the perceived use of the managerial skills and other selected variables, and finally to compare differences in the perceived use of the skills prior to and after an educational intervention.

PROCEDURES

THE CONCEPTUAL FRAMEWORK

In this effort to evaluate the effectiveness of a formally structured management educational effort, a conceptual framework embracing three bodies of philosophy was utilized. A philosophy of management, adult education principles and theories with regard to the learning processes, and evaluation from an educational perspective was examined at the onset of the study. A definition of management proposed by Montana and Charnov (1987, p. 2) provided the approach for the study. That definition,

> "Management is working with and through other people to accomplish the objectives of both the organization and its members."

places an emphasis on the person, focuses on the results to be accomplished and integrates personal and organizational objectives. Management education was viewed as the provision of formal educational programs recognized by academic institutions, as opposed to management development which is designed to provide managers with insights and tools or a skills development orientation (Cunnington, 1986). Drawing from the recommendations of Patton (1978, 1987) and Robinson (1989), and the compilations of Cox and Beck (1980), a research design was developed that could effectively evaluate the results of a management education course for extension professionals in Iowa.

THE RESEARCH DESIGN

Descriptive data was gathered and used to satisfy the first two objectives. Two research hypothesis were tested to satisfy the other two objectives.

The hypotheses were stated as follows:

H_1 There is no relationship between the perceived use of various management skills and selected variables.

H_2 There is no significant difference in the perceived use of selected management skills prior to and after an educational intervention.

A nonequivalent control-group design was chosen using an analysis of covariance technique to compensate for initial differences in the two groups. According to Borg and Gall (1983), the main difficulty in using this type of quasi-experimental design is the non-random assignments of the experimental and the control group. Since the group of extension professionals who elected to participate in the 1988 management course comprised the experimental group and the control group was selected from remaining professional not enrolling or having previously taken the course, it was not possible to randomly assign the subjects. The analysis of co-variant technique was used to compensate for the initial differences between the two groups. The nonequivalent control group design used in this study was as follows:

Experimental Group	Opre	T	Opost
Control Group	Opre		Opost

The treatment for the experimental group was participation in the Management Styles in Extension graduate course offered through the Department of Agricultural Education at Iowa State University.

THE ASSESSMENT INSTRUMENT

Permission was granted to use The Management Effectiveness Profile System (MEPS), a validated and reliable instrument marketed by Human Synergistics, to measure selected management skills and abilities. Ninety items identified fifteen distinct managerial skills organized into three general areas of task skills, people skills and personal factors. Those fifteen managerial skills identified were goal setting, effective planning, identifying and solving problems, organizing, making decisions, delegating, team building, evaluating performance, managing conflict, time effectiveness, stress reactions, commitment, trust, results orientation and summary perceptions. Both groups answered the MEPS before the course offering and again in a six month follow up. Descriptive data were gathered from both groups to describe the population of the study.

ANALYSIS OF DATA

Data for the first set of objectives were descriptive. The data base for the rest of the study was developed from this set. The variables looked at were group (experimental or control), gender, age, present position, number of different positions held, educational level, length of service, self-rating on management skills, and how management skills were learned. Descriptive research objectives required an examination of mean scores, ranges, and standard deviations for each research variable and each group of variables for both the total population in the sub-groups of the population.

Although the subjects for this study comprised a sub-group of Iowa Cooperative Extension Service professionals, it was assumed to be representative of the total group of extension professionals in Iowa, therefore, inferential statistics were chosen for the data analysis.

Multiple regression analysis was used to examine the predictive power of the variables labeled demographic factors and their relationship to perceived management skills. An analysis of co-variance was chosen to test the differences in the two groups in perceived management skills that resulted because of participation in the management education course.

RESULTS

Through the use of the Management Effectiveness Profile System (MEPS) all fifteen variables were found to be perceived to be important to 145 extension professionals in Iowa. On a seven point scale, with one being most descriptive of a dysfunctional management behavior and seven a corrected management behavior, the mean for all was above the midpoint. Those variables with mean scores were goal setting (5.28), problem solving (5.40), planning (4.99), organizing (5.41), decision making (5.45), delegating (5.50), team building (5.56), performance evaluation (5.47), developing subordinates (5.48), managing conflict (5.35), time effectiveness (5.12) and stress reaction (5.27), commitment (5.69) and trust level (6.14), results orientation (5.65) and summary perceptions (5.56).

The two groups, experimental (n=82) and control (n=63) were matched as evenly as possible and eight identical subgroups were identified to describe the population. Those subgroups were Youth Specialist (e=11 c=16), Home Economics Specialist (e=14 c=15), County Extension Director (e=15 c=9), Ag Specialist (e=4 c=1), Dual Position (e=17 c=13), Subject Matter Specialist (e=13 c=6), Area Director (e=2 c=2) and Other (e=6 c=0). The findings indicated that all eight groups perceived to use and find important the 15 identified managerial skills. The majority of the respondents (66.21%) had held two or more positions within the extension service and 59.34% possessed a Masters or higher degree level.

More than half (67.43%) had worked for extension for six years or more and 82.01% had learned their management skills either on the job or from working with others. Only 9.16% rated themselves as having excellent management skills with 70.42% feeling their possessed good management skills.

A stepwise multiple regression found that self-rating of management skills was significantly correlated, as a negative factor with all 15 identified skills. Age and length of service were found to be positively correlated with the 15 variables but educational level did not enter the regression. An analysis of covariance was used to test if there was a significant difference in the perceived use of management skills prior to and after the educational intervention. A significant difference appeared with goal setting (F=6.71), effective planning (F=14.49), organizing (F=8.16), delegating (F=8.10), team building (F=4.73), and evaluating performance (F=8.22). These were particular areas that were taught to in the course work, therefore, a conclusion was reached that it was possible to teach management sills to extension professionals in Iowa.

CONCLUSIONS AND RECOMMENDATIONS

The findings of this study had significant implications to professionals now serving the Extension Service, to extension administrators and educators and to those individuals who aspire to be employed as an extension professional. The study identified a need to possess certain management skills critical to carrying out an extension professional's role. Based upon these finding, it was recommended that in-service education for extension professionals include courses in management. Since it was established that certain management skills can be taught and learned, curriculum developed for pre-service, undergraduate, and graduate programs with an extension component should include management education. Persons interested in an extension career should be encouraged to develop managerial skills. Orientation programs for new extension employees should introduce concepts of management skills and continued training should be incorporated as a professional development program. And finally, those departments preparing individuals for professional roles, should provide course work in managerial skills to help equip them for those roles.

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THE USE OF SCHOOL LAND LABORATORIES AMONG AGRICULTURE TEACHERS IN WEST MALAYSIA

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INTRODUCTION

In Malaysia, agriculture has been offered at lower secondary, upper secondary and vocational agriculture schools. In secondary schools, agriculture has been offered as agricultural science and as one of four elective subjects. In vocational schools, a broader scope of agriculture has been taught for students who want to pursue agriculture as a career.

The importance of laboratory learning has been emphasized by many scholars in agricultural education. One way of providing laboratory experience for students has been through the school land laboratory. The land laboratory can serve as an excellent means for students to learn by doing (Binkley & Tulloch, 1981). McMillion (1975) stated that the use of school land laboratories gives students the opportunity to learn agricultural skills firsthand.

The changing demographics of students enrolled in agriculture programs also affects the need for school land laboratories. McMillion (1975) noted that the backgrounds of the agriculture student population has increased the dependence upon school-owned laboratory facilities. Tulloch (1968) found that agriculture teachers in urban schools are faced with many problems in providing students with opportunities to put agricultural knowledge into practice.

In Malaysian schools which offer agriculture as a subject, school land laboratories have been the only instructional resources used that allow students to learn and practice skills in agriculture. Land is a scarce resource in many schools. Any secondary school planning to offer agriculture must have land that can be used as a school land laboratory. As a result, some schools have not been not able to offer agricultural science because there was no land available near to the schools which could be used as a school land laboratory. Further, as pupil enrollment expands, the need for additional classrooms or buildings also increases. Inevitable, land which is reserved for land laboratories get utilized for the construction of buildings. As a result, practical work suffered, sometimes to the extent that schools have had to drop agriculture altogether as an elective subject. On the other hand, some schools have had school land laboratories which have been underutilized. In addition to this, other schools have had school land laboratories that were too small for the number of students who were taking agriculture. The majority of the schools which offered agricultural science at the lower and upper secondary school level located in rural areas. In addition, there was a very limited number of schools which offered agricultural science at the upper secondary level. Secondary vocational agriculture schools on the other hand, have had school land laboratories which were designed specifically to meet one of the objectives of the schools - to prepare students for employment. Despite this, many of the graduates from these schools have had difficulty finding jobs. One of the reasons has been that the graduates were lacking in practical skills.

No studies were identified concerning school land laboratories in Malaysia. Therefore, it was unclear to what extent teachers used the land laboratories in teaching agriculture. Thus the research problem under investigation in this study was perceived under use and/or misuse of land laboratories in agricultural science program in secondary schools in West Malaysia This study dealt with obtaining information about the use of and attitudes toward land laboratory among agriculture teachers. Data were also gathered on problems teachers faced when using land laboratories and competencies needed in operating land laboratories.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to examine the use of school land laboratories as an instructional resource in the secondary schools in West Malaysia. The specific objectives were:

1. to determine the extent agriculture teachers use the school land laboratory to provide practical experience to students.
2. to determine the attitudes of lower secondary school, upper secondary school and vocational agriculture teachers toward the land laboratory.
4. to identify competencies needed in operating school land laboratories.
5. to identify problems teachers faced in operating the school land laboratory.

PROCEDURES

The target population for this study was Malaysian agriculture teachers who were teaching agriculture in secondary and secondary vocational schools in Malaysia. This study employed a descriptive-comparative survey method. The groups involved in this study were lower secondary school agricultural science teachers (LSSAST) (N=489), upper secondary school agriculture science teachers (USSAST) (N=65) and vocational agriculture teachers (VAT) (N=27). The sample size for lower secondary school teachers was determined by a formula proposed by

Krejcie and Morgan (1970).

The data were collected using a mailed questionnaire. The instrument consisted of four parts. Part I comprised statements to indicate the extent to which teachers used the school land laboratory as an instructional resource. Part II consisted of statements that determined teachers' attitudes toward the school land laboratory. Part III contained statements indicating competencies teachers needed in using school land laboratories. Part IV consisted of statements concerning problems teachers faced in operating school land laboratories. Part V of the instrument was designed to gather demographic data from the teachers selected for this study. The reliability for each part of the instrument as follows: Part I, r=.78; Part II, r=.73; Part III, r=.72; and Part IV, r=.60. The data were summarized using descriptive and inferential statistics.

RESULTS

Eighty-five percent and 81.5% of lower and upper secondary school agricultural science teachers responded to the questionnaires. All vocational agriculture teachers responded to the questionnaires.

The size of land laboratories reported by lower and upper secondary school agriculture science teachers was rather small. The average size of the school land laboratory was 0.77 and 0.67 acres for lower and upper secondary schools, respectively. On the other hand, vocational agriculture teachers reported a wide range in size of school land laboratory, with average size being 8.09 acres.

USE OF SCHOOL LAND LABORATORIES BY TEACHERS

The lower and upper secondary school agriculture science teachers reported that they usually supervised their students, provided task assignments, provided classroom instruction prior to task performance, and required students to apply approved practices when working on the land laboratory. The statement that had the least mean score was teachers' uncertainty as to how to best use the land laboratory in their teaching. The statement was rated 1.93 and 1.92 by lower and upper secondary school agriculture science teachers, respectively.

Vocational agriculture teachers reported that they usually required students to apply approved practices and supervised them when working on land laboratory. In addition, they usually used the land laboratory to illustrate diverse activities in agriculture and they often made the management decisions for the school land laboratory (M = 3.72). Teachers indicated that they never used the land laboratory for co-curricular activities (See Table 1).

Table 1
Mean and Standard Deviation of School Land Laboratories Uses as Reported by Agriculture Teachers

Statements	LSSAST	USSAST	VAT
	Mean SD	Mean SD	Mean SD
1. I use the land laboratory to give demonstrations.	3.32 0.96	3.02 0.89	3.52 0.89
2. I supervise my students when they are working on the land laboratory.	4.45 0.63	4.32 0.67	4.00 0.78
3. I use the land laboratory period to teach theory if I am not finished teaching the required syllabus.	2.29 0.95	2.42 0.87	2.59 0.93
4. I require my students to keep records of work they have done on the school land laboratory	3.05 1.13	2.87 1.13	3.47 1.09
5. I provide related classroom instruction prior to task performance in the land laboratory.	3.94 0.87	3.85 0.80	3.54 0.95
6. I provide laboratory task assignments when students are working in the land laboratory.	3.96 0.97	3.45 1.05	3.55 0.98
7. I require my students do to all routine work on the school land laboratory during laboratory hours	2.66 1.20	2.45 1.12	2.89 0.93
8. I make the management decisions for the school land laboratory.	3.62 1.05	3.66 0.98	3.72 0.79
9. I require my students to manage the land laboratory during weekends.	2.45 0.97	2.32 1.07	2.89 1.05
10. I use the land laboratory to conduct experiments.	2.58 1.06	2.77 1.12	2.67 0.92
11. I require my students to apply approved	3.95	3.83	4.04

practices on the school land laboratory.	0.83	0.83	0.76
12. I use the land laboratory for students' individual projects.	2.44 1.26	2.60 1.25	2.93 1.14
13. I use the land laboratory for students' group projects.	3.81 1.02	3.60 0.99	3.56 1.01
14. I use the land laboratory to teach students skills which prepare them for employment.	3.07 1.17	3.02 1.05	3.48 1.19
15. I use the land laboratory to generate income to support the agricultural program.	2.12 1.13	2.25 1.11	2.52 1.16
16. I assist my students in planning land laboratory activities.	3.51 0.97	3.48 0.80	3.44 0.97
17. I am unsure how to best use the land laboratory in my teaching.	1.93 0.82	1.92 0.82	2.22 0.89
18. I use individual or small group instruction in the school land laboratory.	3.45 1.05	3.03 0.91	3.49 0.85
19. I use the land laboratory for co-curricular activities.	2.65 1.16	3.00 0.94	1.85 1.32
20. I would use the land laboratory more if it was larger.	3.41 1.21	3.48 1.02	3.20 1.15
21. My land laboratory is used to illustrate diverse activities in agriculture.	3.54 1.00	3.36 1.08	3.74 0.94

TEACHERS' ATTITUDES TOWARD SCHOOL LAND LABORATORIES

According to the mean rating, teachers tend to agree that the land laboratory is an important resource for students to learn agriculture and to help students learning by doing. The mean rating also fell in the agree range on items related to the importance of land laboratories in teaching agriculture. Overall, teachers tended to agree that the agriculture teacher was the most important factor in the success of the land laboratory. The results also indicated that teachers enjoy working on the land laboratory with their students, that land laboratories should help students learn specific skills, and land laboratories provide a good setting for skill demonstrations. In addition, they tended to agree that land laboratories provide students with opportunities and experiences that they would not receive elsewhere. Teachers also agreed that time used for land laboratory activities was more important than time used for classroom instruction, that land laboratory activities should reflect the agricultural employment needs of the country, and that activities in the land laboratory have a high educational value for their students (see Table 2).

COMPETENCIES NEEDED IN OPERATING SCHOOL LANDLABORATORIES

The lower secondary school agricultural science teachers rated only one item, "Managing discipline as students work on the land laboratory" as a very important competency. Similarly, only one item, "publicizing land laboratory activities in the community" was considered a less important competency by the teachers. On the other hand, the upper secondary school agricultural science teachers rated the on item "connecting land

Table 2
Means and Standard Deviations of Agriculture Teachers' Attitudes Toward School Land Laboratories

Attitude Statements	LSSAST Mean SD	USSAST Mean SD	VAT Mean SD
1. The land laboratory is an important resource for students to learn agriculture.	4.46 0.63	4.36 0.74	4.74 0.45
2. The land laboratory provides opportunities and experiences that students would not receive elsewhere.	3.58 1.05	3.79 1.01	4.08 1.00
3. The agriculture teacher is the most important factor in the success of the school land laboratory.	4.29 0.71	4.30 0.61	4.40 0.65
4. I enjoy working on the school land laboratory with my students.	4.21 0.71	4.11 0.66	4.17 0.53
5. School land laboratories place is not a burden on the agriculture teacher.	3.45 1.07	3.28 1.13	2.84 1.07

6. School land laboratories are not labor intensive.	2.18 0.95	2.15 0.89	1.81 0.88
7. School land laboratories do not take much of my time.	2.89 1.16	2.85 1.07	2.33 1.04
8. School land laboratories help my students learn by doing.	4.37 0.65	4.32 0.58	4.58 0.64
9. Land laboratory activities are suitable for lower achieving students.	1.91 1.02	1.96 0.92	2.11 0.93
10. It is less important to provide classroom instruction than to use the time for school land laboratory activities.	3.95 0.91	3.81 0.86	4.07 0.68
11. School land laboratory activities have a high educational value for my students.	3.88 0.85	3.75 0.74	4.30 0.67
12. It is easy to motivate my students to work in the land laboratory.	3.22 1.01	2.87 1.04	3.04 0.90
13. School time allocated for land laboratory activities is too long.	2.84 1.09	2.75 0.96	3.11 0.93
14. The land laboratory provides a good setting for skill demonstrations.	3.97 0.86	4.10 0.60	4.09 0.68
15. Activities in land laboratories are challenging enough for my students.	3.32 0.94	3.19 0.93	3.33 0.83
16. Land laboratory activities should reflect the agricultural employment needs of the country.	3.88 0.83	3.83 0.79	4.15 0.66
17. Land laboratories should help my students learn specific skills.	4.07 0.84	4.00 0.71	4.22 0.85

laboratory activities to classroom instruction" as a very important competency. They rated the rest of competencies same as the lower secondary school teachers. The highest rating was given to the competency "Developing an annual budget for land laboratory" (*M*=4.35). Vocational agriculture teachers indicated that expanding the land size and publicizing land laboratory activities in the community were considered less important competencies for them to be able to use the land laboratory (see Table 3).

Table 3

Means and Standard Deviations of Competencies Needed in Operating School Land Laboratory by Agriculture Teachers

Competencies	LSSAST Mean SD	USSAST Mean SD	VAT Mean SD
1. Developing an annual budget for land laboratory.	4.28 0.77	4.04 1.03	4.35 0.56
2. Locating and acquiring inputs and resources from the community.	3.83 0.88	3.74 1.09	4.07 0.62
3. Developing a philosophy about using land laboratory.	3.76 0.85	3.55 0.77	3.74 0.81
4. Planning student activities for the land laboratory.	4.41 0.62	4.38 0.63	4.23 0.59
5. Publicizing land laboratories activities in the community.	2.40 1.09	2.28 1.04	3.11 1.05
6. Expanding the land laboratory.	3.44 1.04	3.26 0.88	3.23 0.91
7. Evaluating student work on the land laboratory.	4.35 0.62	4.13 0.73	4.19 0.60
8. Managing the land laboratory on day to day basis.	4.16 0.74	4.02 0.67	4.15 0.60
9. Connecting land laboratory activities to classroom instruction.	4.47 0.55	4.51 0.64	4.33 0.62
10. Keeping inventory on school land laboratory.	4.05 0.76	4.21 0.69	4.22 0.64
11. Using demonstrations on the land laboratory.	4.16 0.74	3.98 0.64	3.96 0.59
12. Using experiments on the land laboratory.	3.76 0.86	3.51 0.80	3.78 0.64
13. Managing discipline as students work on the land laboratory.	4.68 0.55	4.49 0.64	4.26 0.71

14. Keeping students interested in land laboratory activities.	4.39 0.59	4.32 0.58	4.30 0.54
15. Producing high quality agricultural products on the land laboratory.	3.80 0.88	3.62 0.79	3.96 0.71
16. Maintaining the appearance of the land laboratory.	4.30 0.67	4.21 0.53	4.22 0.64
17. Obtaining funds necessary to operate the land laboratory.	4.36 0.64	4.40 0.60	4.22 0.75
18. Marketing products produced on the land laboratory.	2.96 1.05	3.04 1.10	3.76 0.76

PROBLEMS FACED WHEN USING SCHOOL LAND LABORATORIES

None of the items was rated as a major problem by all groups of teachers. Five problems were judged as considerable problems by all teachers. These problems were maintaining school land laboratories during vacation, too many students with low academic ability, vandalism, and lack of extra labor when needed. Both lower and upper secondary school agricultural science teachers did not consider marketing of farm product as a problem when using school land laboratory. However, vocational agriculture teachers rated lowest on item "land laboratory was too small" (*M*=1.56) (see Table 4)

Table 4
Means and Standard Deviations of Problems Faced by Agriculture Teachers in Using School Land Laboratories

Problems	LSSAST Mean SD	USSAST Mean SD	VAT Mean SD
1. Lack of student interest.	2.51 1.00	2.42 0.99	2.15 0.86
2. Lack of teacher confidence in practical agricultural skills.	1.78 0.93	1.92 0.90	1.93 0.78
3. Low educational value of some land laboratory activities.	1.79 0.79	1.91 0.73	1.78 0.80
4. Lack of cooperation from principal.	1.73 1.00	1.74 0.88	1.56 0.75
5. Lack of supplies and facilities.	2.55 1.08	2.28 1.15	2.37 0.80
6. Lack of extra labor when needed.	2.72 1.08	2.72 1.01	2.81 0.92
7. Marketing students' farm produce.	1.46 0.67	1.45 0.64	2.16 0.72
8. Vandalism.	2.78 1.00	2.53 1.13	2.52 0.98
9. Too many students with low academic ability.	2.96 0.92	2.98 0.97	2.59 1.12
10. The land laboratory is too small.	2.27 1.16	2.26 1.09	1.56 0.80
11. The land laboratory is too large.	1.50 0.82	1.53 0.70	1.81 0.83
12. Lack of teacher time.	2.43 1.01	2.66 1.01	2.44 0.97
13. Maintaining school land laboratories during vacation.	3.29 0.85	3.08 1.00	3.11 1.05
14. Unsuitabel farm land.	2.50 1.01	2.38 1.13	2.11 0.97

RESULTS OF CORRELATIONAL AND GROUP COMPARISON ANALYSIS

There was a moderate and significant relationship between teachers' use of school land laboratories and teachers' attitudes toward school land laboratories for all group of teachers. The relationships was *r* = .38 (*p*<.001), *r* =.37 (*p*<.01), *r* =.48(*p*<.01) for lower secondary school teachers, upper secondary school and vocational agriculture teachers, respectively. There was a moderate and significant relationship (*r* =.32,*p*<.01) between upper secondary school teachers' use of school land laboratories and years of teaching experience.

There was a significant difference in attitudes between upper secondary school agricultural science teachers whether or not teachers had taken agricultural science during lower secondary school. Thus, upper secondary school agricultural science teachers who had taken agricultural science tend to have higher attitude score than those who did not take the subject. Similarly, there was a significant difference in use between upper secondary school agricultural science teachers whether or not teachers had taken agricultural science during lower secondary school.

CONCLUSIONS AND RECOMMENDATIONS

1. The lower secondary school agricultural science teachers tend to use land laboratories more as they gain more teaching experience. Teachers using land laboratories for teaching purposes have favorable attitude toward land laboratories.
2. The size of school land laboratories is small, placing restrictions on student involvement in laboratory activities. Teachers and school principals should identify land in the community that could be used to initiate or expand land laboratories.
3. Planning student activities, relating these activities to classroom instruction and planning an annual budget are competencies needed when using land laboratories. Therefore, institutions which produce agriculture teachers should include in their curricula courses in managing and teaching in land laboratories.
4. Lower and upper secondary school agricultural science teachers are facing a lack of supplies, financing, and facilities for operating and using land laboratories.
5. Vocational agricultural teachers tend to use more diverse activities, present more demonstrations, and provide less structured assignments to students while working in the land laboratory.
6. Vocational agriculture teachers seldom use land laboratories to provide skills which will prepare students for employment. Agriculture teachers should establish linkages with agricultural agencies to ensure that they are up-to-date with current agricultural knowledge and practices.
7. Upper secondary school agricultural science teachers who take agricultural science in lower secondary schools have more positive attitudes and use land laboratories more when they become agriculture teachers.
8 Curriculum developers should re-examine the philosophy of land laboratories in secondary schools to ensure that land laboratories serve their intended purposes, including application of theory, skill development, job training, and testing of new technology.

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THE COMMITMENT OF PENNSYLVANIA VOCATIONAL EDUCATORS TO STUDENT ORGANIZATIONS

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INTRODUCTION

Commitment to one's job is perhaps the best predictor of employee turnover (Siegle & Ruh, 1973; Porter, Steers, Mowday & Boulian, 1974; Porter, Crampon & Smith, 1976; Steers, 1977; Koch & Steers, 1978; Grady, 1989). Extrinsic antecedents such as appropriate salaries, length of occupational tenure, increased age, and entrance into later career stages are positively related to commitment (Steers, 1977; Farrell & Rusbult, 1981; Rhodes, 1983; Morrow & McElroy, 1987). Since commitment to one's job tends to be an indicator of employee turnover, it is critical that factors related to the commitment of teachers be investigated. McCracken and Etuk (1986) found that the two most important antecedents of the commitment of secondary agriculture teachers were: (1) the belief that teachers were making a contribution to the profession and (2) the degree of challenge the teachers believe their job possesses. Grady (1989) analyzed relationships between career commitment and turnover of vocational teachers and found as job/role expectations increased, so did commitment.

What challenges and additional factors do teachers who advise youth organizations face? Additionally, is there a relationship between the development and management of youth organizations and teacher commitment? Each vocational service area has a youth organization associated with its program. Youth organizations are charged with providing leadership and character development opportunities that promote scholarship, citizenship, service and professionalism (Thompson, 1973). Through these organizations youth can become involved in educational experiences by participating in contests, awards, and related activities.

Phipps and Osborne (1988) indicated that supervised agricultural experience, the FFA, and classroom/laboratory instruction are integral parts of an agricultural education program. Blezek (1986) found that secondary agricultural instructors, state supervisors of agriculture and agricultural teacher educators in Nebraska rated advising meetings and activities of the FFA and FFA public relations activities as high priority items when asked to prioritize tasks of the secondary agricultural instructor. Other vocational teachers are also heavily involved with laboratory instruction and the development of leadership and personal skills through student organizations. For all areas of vocational education, therefore, student organizations are an integral part of the instruction. Bender (1964) and Collins (1977) stated that vocational youth organizations enhance the relevance of vocational and technical education. In addition, vocational youth organizations are assumed to be the basis for expanding students' beneficial experiences above and beyond those provided by general education. Such experiences have been identified as community and civic awareness, career growth, social development, and leadership characteristics (Collins, 1977). Wenrich and Wenrich (1974) suggested that:

> Vocational education administrators should encourage and assist teachers in the development and use of Vocational Student Organization (VSOs). Through such organizations vocational students can be involved in the decision making process at a point where they are most directly affected. Local chapters of these organizations can be a powerful influence in bringing the world of work and the school into a closer working relationship, resulting in more realistic vocational instruction (p. 178).

If vocational instructors should provide students with leadership and personal development skills, both technical and social, for attaining and retaining employment and if VSOs can aid in the development of those skills in the affective domain, the degree of commitment of vocational instructors to VSOs needs to be investigated. While numerous studies have examined organizational commitment as it relates to an occupation, few have focused on the commitment of secondary vocational teachers as it relates to vocational student organizations.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the degree of commitment that vocational educators have to advising student organizations. To accomplish the purpose of this study, the following objectives were formulated:

1. To determine and compare how committed secondary agricultural educators, automobile instructors, carpentry instructors, and occupational home economics teachers are to student organizations.

2. To determine if selected demographic and programmatic variables can explain the commitment of secondary vocational educators to student organizations.

PROCEDURES

Sample

The study was conducted using a design appropriate for descriptive correlational research. The target population included all Pennsylvania secondary agricultural educators, occupational home economics teachers, automobile instructors, and carpentry instructors. These teachers were selected because they advise three of the oldest and largest vocational student organizations (FFA, FHA, and VICA). Adult education instructors were excluded from the population. A stratified random sample consisting of secondary agricultural educators (161), occupational home economics teachers (131), automobile instructors (86) and carpentry instructors (70) was chosen for the study. This sample size reflects a 5% margin of error (Krejcie & Morgan, 1970).

Instrumentation

Based on a literature review, the researchers developed an instrument to measure the commitment of instructors to student organizations. Sociodemographic and programmatic data were also collected. A panel of experts consisting of five faculty and graduate students in the Department of Agricultural and Extension Education at The Pennsylvania State University indicated that the instrument had good content and face validity. During a pilot test, a scale designed to measure commitment to student organizations was found to be reliable. In addition, data collected from 336 teachers included in the sample who responded to a mailed questionnaire were used in estimating the reliability of the commitment scale (Cronbach's alpha .93).

ANALYSIS OF DATA

The instrument was mailed in March 1990 to 448 teachers chosen for the study. The teachers were given six weeks to respond to the questionnaire. An initial and two follow-up mailings yielded a 75% return rate (336 of 448 teachers). Early and late respondents were compared on their level of commitment to student organizations and selected demographic characteristics (Miller & Smith, 1983). No statistically significant differences were found between early and late respondents on any of the variables. Analysis of variance, *t*-test and stepwise multiple regression were used to analyze the data. The data were analyzed using the Statistical Package for Social Sciences (SPSS^x 3.1) at The Pennsylvania State University.

RESULTS

Characteristics of Vocational Educators

Of the 336 secondary vocational teachers participating in the study, 261 (78%) were male. No female automobile or carpentry teachers responded. The mean age of the teachers was 43 years, and they had taught vocational education a mean of 14 years. Teachers reported that a mean of 33 students were enrolled in their programs and that 60% of the students who enrolled in their courses joined VSOs. However, 51 teachers (16%) indicated they did not have any VSO members. Demographic and programmatic data are presented in Table 1.

Table 1. Summary of Selected Demographic and Programmatic Variables by Vocational Teaching Area.

	Agricultural Education Instructors $n=136^a$	Automobile Mechanics Instructors $n=53^a$	Carpentry Instructors $n=48^a$	Home Economics Instructors $n=99^a$	df	test[b]
Gender						
Male	122			39	1,231	$x^2 = 63.832$***
Female	14			57		
Additional occupation						
Yes	62	22	27	33	3,325	$x^2 = 7.251$
No	74	30	19	61		
Type of certificate						
Regular Ag Ed (Inst. I, II)	96	3	4	44	3,280	$x^2 = 107.816$***
Vocational (Voc. I, II)	19	40	35	42		
Average number of students in program	39 AB	30 B	34	27 A	3,322	f = 8.200***
VSO membership (%)	73 A	36 AB	40 AB	64 B	3,314	f = 15.653***
Years taught(mean years)	15	15	13	13	3,325	f = 1.585
Age (mean years)	41 AB	51 B	47	47 A	3,331	f = 8.599***
Contract length						
≤ 9 months	40	22	24	44	3,312	$x^2 = 13.550$**
≥ 10 months	93	28	18	46		
AVA membership						
Yes	28	12	11	16	3,322	$x^2 = 1.371$
No	108	40	33	77		

* $p \le .05$; ** $p \le .01$; *** $p \le .001$

[a] numbers vary due to missing cases

[b] x^2 = Chi-square; f = oneway ANOVA

Values followed by different capital letters were found to be significantly different $p \le .05$ by the Scheffe multiple range test.

Gender. There is a significant difference between gender and teaching area. The majority of agricultural teachers are male (90%). Forty percent of the home economics teachers were male. No female carpentry or automobile mechanic instructors responded.

Additional Occupation. As shown, 46% of agricultural educators, 42% of carpentry instructors, 59% of automobile mechanic instructors, and 35% of home economics teachers are employed in a job other than teaching. There is no significant difference between teaching area and having an additional occupation.

Certification. Data show a significant difference between certification type and teaching area (p=.000). The majority of agricultural instructors (86%) hold regular certificates (Instructional I or II). However, 78% of carpentry and automobile mechanic instructors hold vocational certificates (Vocational I or II). About one-half of home economics teachers (47%) hold an Instructional I or II certificate and 45% hold a Vocational I or II certificate.

Average Number of Students in Program. There is a significant difference between the average number of students in the program by teaching area (p=.000). Agricultural educators have significantly more students in their program than home economics and automobile mechanic instructors.

Vocational Student Organization Membership. Agricultural education and home economics instructors have significantly more students enrolled in VSOs than automobile and carpentry instructors.

Years Taught. There is no difference between vocational teaching area and years taught. The mean number of years taught for agricultural and automobile mechanics instructors is 15 years. The mean number of years taught for carpentry and home economics teachers is 13 years.

Age. There is a significant difference between age and teaching area (p=.000). Agricultural educators were significantly younger than automobile and home economics instructors.

Contract Length. There is a significant difference between contract length and teaching area (p=.004). Data indicate that 70% of agricultural educators have teaching contracts greater than or equal to 10 months. The rest of the vocational teacher groups are divided equally between contracts that are less than or equal to 9 months and contracts greater than or equal to 10 months.

AVA Membership. The majority of all vocational teacher groups do not belong to the American Vocational Association. Twenty-one percent of the agricultural educators, 23% of automobile mechanic, 25% of the carpentry and 17% of the home economics instructors indicated they are members of AVA.

RELATIONSHIPS BETWEEN VARIABLES

Table 2 presents Pearson product moment correlations coefficients between the major demographic and programmatic variables and commitment to student organizations. Statistically significant, positive relationships were found between the dependent variable, commitment to student organizations, and agricultural education teaching area, vocational student membership rate, number of students in program, number of children, and being an advisor. Statistically significant, negative relationships between commitment to student organizations and type of certificate (having a vocational certificate), automobile and carpentry teaching area and age. There were no relationships between commitment to student organizations and being employed in an additional occupation, marital status, length of teaching contract, gender, AVA membership, and years of teaching vocational education.

Table 2. Relationship Between Commitment to Student Organizations and Selected Demographic and Programmatic Variables.

Variable	r	p
Agricultural education*	.464	.000
Automobile mechanic*	-.337	.000
Carpentry*	-.272	.000
VSO membership	.603	.000
Number of students in program	.114	.037
Type of certificate**	-.408	.000
Number of children	.115	.036
Advisor status*	.519	.000
Age	-.133	.000

*(no=0; yes=1); **(Instructional I, II =0; Vocational I, II =1)

Vocational Teacher Area

Teachers were asked to indicate using a 5-point Likert scale how selected activities influenced their commitment to student organizations. The mean commitment to vocational student organizations score for the teachers was 3.21 on a 5-point scale which indicates that teachers were slightly above average in their commitment. When student organization commitment was analyzed by the vocational teacher group, agriculture teachers emerged as the most committed, followed by occupational home economics teachers and carpentry instructors. Automobile instructors were least committed to student organizations (see Table 3).

Selected demographic and programmatic variables examined in the study may explain commitment to student organizations. To investigate the existence of these relationships a stepwise regression analysis was used to determine the entry of the selected independent variables into an equation to explain the variance in commitment to student organizations.

Table 3. Commitment to Student Organizations by Vocational Teaching Area.

Vocational Teaching Area	Commitment Score	df	F
Agricultural Educator	3.86^{A}	3,304	43.793***
Automobile Mechanic	2.19^{B}		
Carpentry	2.47^{B}		
Home Economics	3.17^{C}		
Overall	3.21		

*** $p \leq .001$

Scale: 1= Never influenced; 2= rarely influenced; 3= sometimes influenced;4= usually influenced; 5= consistently influenced commitment to student organizations

Means followed by different capital letters were found to be significantly different $p \leq .05$ by the Scheffe multiple range test.

Table 4 presents the summary statistics for the regression model. The stepwise multiple regression model yielded three variables that explained 49% of the variance in commitment to student organizations. This analysis indicated that vocational student organization membership rate was the best indicator of commitment to student organizations. Commitment to student organizations increased as the VSO membership rate increased. Being an advisor to a vocational student organization increased the degree of commitment to student organizations. Additionally, agricultural education, carpentry and occupational home economics teachers as a group are more committed to student organizations than automobile instructors.

Table 4. Stepwise Regression of Commitment to Student Organizations on Selected Demographic and Programmatic Variables.

Variable	Multiple R	R^2	Beta	F
VSO Membership	.60	.36	.0135	93.203*
Advisor Status	.69	.48	.7510	38.76*
Automobile Instructors	.70	.49	-.3546	4.49*

*$p \leq .05$

CONCLUSIONS

1. The best indicator of commitment to student organizations is vocational student organization membership rate. Agricultural educators reported the highest VSO membership rate (73%), while home economics and carpentry instructors reported 64% and 40% VSO membership rates, respectively. Automobile instructors reported the lowest VSO membership rate (36%).

2. Those vocational instructors who were advisors during the 1989-90 school year were significantly more committed to student organizations than those teachers who did not advise.

3. Agricultural education teachers, carpentry and occupational home economics teachers are significantly more committed to student organizations than automobile instructors.

The above conclusions may be partially explained by several factors inherent in the way vocational education is delivered in Pennsylvania. Eighty-five vocational-technical schools offer instruction at secondary and postsecondary levels. Senior high school students are typically transported for half the school day to vocational schools for specialized instruction in areas such as carpentry, building trades, or cosmetology. They spend the other half of the school day in their respective home schools in academic classes. The ability of vocational teachers to organize and coordinate student organizations may be compounded by the problem of distance and difficulties associated with students getting transportation home. Most agricultural education teachers in the commonwealth do not encounter this problem. While 73% of the secondary agriculture departments in Pennsylvania are located in comprehensive high schools, 70% of the occupational home economics programs, 77% of the automotive programs, and 84% of the carpentry programs are located in vocational schools. Finally, participation in Pennsylvania VSO (60%) is high when compared with previous findings that 27-77% of students in grades 9-12 participated in extracurricular activities and clubs (Verro, 1976).

RECOMMENDATIONS

The findings achieved in this preliminary research raise several important questions. Is the rate of student participation in a VSO a true indicator of the teachers' commitment to student organizations? Is membership in a VSO a reflection of the students' perceived value of VSO, which in turn is positively or negatively influenced by the teachers' opinion of VSO? If students benefit from participation in vocational student organizations as several authors suggest (Bender, 1964; Welton, 1971; Squires, 1974; Wenrich & Wenrich, 1974; Collins, 1977; Oregon State Department of Education, 1977; Phipps & Osborne, 1988; Neff, 1982; Carter & Neason, 1984; Debertin & Williamson, 1987; Miller, 1988), then vocational administrators and secondary vocational educators should focus on increasing the local VSO participation. In addition, vocational teachers and their administrators should allow time in the school day for VSO meetings and provide opportunities for students to enroll and participate in a VSO. Additional research should be conducted to verify the findings of this study.

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EFFECTIVENESS OF TEACHING PERFORMANCE: DIFFERENCES IN THE PERCEPTIONS OF VOCATIONAL EDUCATION TEACHERS AND THEIR PRINCIPALS

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INTRODUCTION

Effective teaching involves, careful planning, effective execution of instructional presentations, and proper management of the educational environment. The teacher represents the primary factor which will determine if learning will occur in any classroom. The general public perceives that teachers should be held accountable for their instructional programs and that they should be evaluated to determine the effectiveness of their teaching performance. However, the appraisal of teacher performance has presented numerous problems because there are conflicting perceptions for the purposes of evaluation. Evaluations are often viewed by teachers as a basis for administrators to make negative personnel decisions. This interpretation often generates unfavorable or suspicious feelings by the teaching profession about being evaluated and toward those doing the evaluation. However, in spite of the problems associated with conducting teacher evaluations, it seems likely that with the growing public demand for accountability, teacher evaluations will be increasingly used for the purpose of providing information needed for determining inservice educational needs of teachers as well as for making staffing decisions (Webb, 1983).

The North Carolina Department of Public Instruction has developed an Effective Teacher Training Program to help improve the quality of education offered in the secondary schools across the State. To implement the program, a thirty-hour inservice training program has been conducted statewide for all public school educators. To address the issue of accountability, the Department has developed and adopted a teacher performance appraisal system as a component of the Effective Teacher Training Program that focuses on 38 instructional practices identified in the literature as being associated with effective teacher performance (Hyde, 1985).

The Division of Vocational Education within the Department of Public Instruction is interested in assuring that vocational teachers effectively conduct their specialized teaching responsibilities. However, in addition to the teaching techniques and student learning experiences used in the regular academic classroom, the learning environment within the vocational education classes also includes teaching activities such as hands-on, laboratory and/or shop experiences, supervised on-the-job training, live projects or other production work activities, and an individualized approach to instruction. The State adopted instrument used in the teacher performance appraisal system encompasses few examples which relate to the application of the hands-on or off-site teaching-learning situations utilized by vocational education teachers (Watson, 1987). Therefore, a need exists to determine if the state adopted teacher performance appraisal system can be used to fairly assess the teaching effectiveness of vocational education teachers, considering the learning environments within vocational education classes.

PURPOSES AND OBJECTIVES

The purposes of this study were to determine the effectiveness of the teaching performance of vocational education teachers in North Carolina, to determine if significant differences existed between the perceptions of vocational education teachers and those of their principals toward the effectiveness of the teaching performance of the teachers, and to determine the suitability of the state adopted teacher performance appraisal system assessment instrument for evaluating the teaching effectiveness of vocational education teachers. More specifically, the research objectives of this study, stated as research questions, were as follows:

1. To what extent do vocational education teachers in the Central Region of North Carolina perceive that their teaching performance is effective when using the State adopted teacher performance appraisal system as an instrument for self-assessment?
2. To what extent do the principals of vocational education teachers in the Central Region of North Carolina perceive that the teaching performance of their teachers is effective when using the State adopted teacher performance appraisal system as an instrument for evaluating the teachers' performance?
3. Does a statistically different perception exist between vocational education teachers and their school principals toward the effectiveness of the teaching performance of the vocational teachers when using the State adopted teacher performance appraisal system as an instrument for evaluating the performance of vocational education teachers?
4. Can the North Carolina adopted teacher performance appraisal instrument be used as an adequate means for evaluating the teaching performance of vocational education teachers?

PROCEDURES

The population for this study consisted of all middle and high school vocational education teachers in 16 of the 18 local school systems in the Central Education Region (Region III) of North Carolina during the 1987-88 academic year (N = 843). Two superintendents in Region III failed to give consent for their school systems to be involved in the study and thus, the teachers within those two systems were not included in the research population. A list of vocational education teachers was provided by the vocational education director in each of the participating school systems and was used to provide the frame for the study.

According to Krejcie and Morgan (1970), a sample size of 269 was needed to represent the population of 843. However, since the typical return rate for questionnaires sent to vocational education teachers, based on previous North Carolina studies, has been approximately 60%, oversampling was determined to be necessary to meet the sampling requirements. Based on the considerations related to the required sample size, traditional return rates , and the need for oversampling as discussed by Hinkle, Oliver, and Hinkle (1985), a decision was made to increase the research sample to approximately 450 teachers. Seven of the 16 school systems in the research population were selected to have their vocational education teachers be involved in the study by drawing a stratified random sample of school systems based on student population, geographic location, and education level (middle school versus high school). The research sample (n = 443) was composed of the vocational education teachers employed in the seven selected school systems.

The teacher performance appraisal instrument which was developed and adopted by the North Carolina Department of Public Instruction as a component of the Effective Teacher Training Program was slightly modified and used to collect the research data. Content validity of the modified instrument was determined by the use of a panel of experts and the instrument was pilot-tested for clarity and readability. Reliability coefficients calculated to determine the internal consistency of the instrument for the major instructional functions of the instrument ranged from .64 to .91 and overall reliability rating for the instrument was .84.

Data were collected near the end of the 1987-88 academic year. The teacher performance appraisal instruments were distributed to the vocational education teachers during group meetings which occurred between January 20, 1988 and March 22, 1988. The group meetings were designed to inservice the teachers on how to properly complete the instruments for doing self-assessments of their teaching performance. Responses (self- assessments) were received from 217 teachers following the initial distribution. Teachers who had not responded by May 1, 1988 received a follow-up letter urging them to complete the questionnaire. This procedure resulted in an additional 26 responses for a total of 243 responses (54.9% of the sample). According to Miller and Smith (1983) late respondents have been found to be very similar to nonrespondents. Based on this finding, data from late respondents (those who responded after receiving the follow-up letter) were statistically compared to data from early respondents. Since t-tests indicated no significant differences between early and late respondents, the data sample was assumed to be representative of the population and the data from early and late respondents were combined for research purposes.

The principals of the 243 teachers who completed self-assessment instruments were mailed a teacher performance appraisal instrument which was to be completed for each vocational teacher on May 20, 1988. The principals were also sent consent forms, signed by the teachers, which gave the principals permission to release their completed evaluations of the teaching performance of the teachers for research purposes. Principals completed and returned evaluation instruments for 152 of the vocational education teachers following the initial distribution. Principals who had not returned their completed evaluations by June 30 were sent a follow-up letter requesting their participation in the study. This procedure yielded completed evaluation instruments for 24 additional teachers by July 15, 1988. Since t-tests indicated no significant differences between early and late respondents, the data sample was assumed to be representative of the population of principals and the data from early and late respondents were combined for analysis.

Analysis of the data was computed for the 176 vocational teachers for which both self-assessment and principal completed instruments were available. Descriptive statistics such as frequencies, percentages, and means were used to describe the data. Multivariate analysis of variance (MANOVA) procedures were used to determine whether significant differences existed between the teacher self-assessments and the principal evaluations of the teaching performance of the vocational education teachers. According to Tatsuoka (1971), the Hotelling-Lawley Trace Test is the appropriate MANOVA statistic to use when the data being analyzed represents means of two separate two groups. The MANOVA techniques used in this study provided a way to analyze the overall differences between means for the two groups, teachers and principals, for each of the major instructional functions under study in order to avoid inflating the experiment- wise alpha. When differences were found with the MANOVA procedures, one-way analysis of variance (ANOVA) procedures were used as a follow-up procedure to analyze the data for each of the instructional practices within the particular major instructional function to isolate the differences. Downie & Heath (1974) set forth the assumptions which should be met when using analysis of variance procedures. These assumptions were addressed in this study through the random selection of the individuals making up the sample and the data was determined to be homogeneous by analyzing the data using Box's M Test of Homogeneity. An alpha level of .05 was set a priori for the study.

RESULTS

The teacher performance appraisal instrument which was developed and adopted by the North Carolina Department of Public Instruction was slightly modified and used as the data collection instrument for this study. Teachers were asked to provide a self- assessment of their teaching performance using the instrument and their principals were asked to evaluate the performance of their teachers utilizing the same instrument. The instrument was designed to be used for measuring teacher performance for 38 instructional practices which were identified in the literature as being associated with effective teacher performance (Hyde, 1985). The instructional practices were categorized into eight major instructional functions, as identified in Table 1. Respondents used a six point scale for rating teacher performance for each of the 38 instructional practices within the eight major instructional functions. The rating scale was: (1) unsatisfactory; (2) below standard; (3) at standard; (4) above standard; (5) well above standard; and (6) superior. The mean rating for the teacher self-assessments and the principals evaluations are presented in Table 1 along with the results of the MANOVA procedures.

As shown in Table 1, the results of statistical analysis of the data using MANOVA procedures indicated that the assessments of the vocational education teachers and their principals were not statistically different ($p > .05$), for the following major instructional functions, "management of instructional time," "instructional presentation," "instructional feedback," and "facilitating instruction." Since the MANOVA procedures failed to indicate any significant differences between the assessments of teacher performance by the teachers and principals for these major functions, further analysis was not warranted to examine the specific instructional practices categorized within these functions. However, it was of interest that the teachers rated their performance slightly higher than did their principals for all four of these major instructional functions. Both the vocational education teachers and their principals felt that the performance of the teachers were "above standard" to "well above standard" for these instructional functions.

Also, as reported in Table 1, significant differences were found with the MANOVA procedures between the assessments of teacher performance by the vocational education teachers and their principals for the major instructional functions of "management of student behavior," "instructional monitoring of student performance," " communication within the educational environment," and "performing non-instructional duties." One-way analysis of variance (ANOVA) procedures were used to analyze the data for each of the instructional practices within these major instructional function to isolate the differences and are reported in Tables 2-5.

Table 1

Vocational Education Teacher Performance by Major Instructional Function as Determined by Teacher Self-Assessments and Principal Evaluations

Major instructional functions	Teacher Self-assessments M^a	Principal Evaluations M^b	F	p
Management of instructional time	4.85	4.69	2.98	.085
Management of student behavior	4.85	4.57	7.83	.005*
Instructional presentation	4.74	4.64	.99	.320
Instructional monitoring of student performance	4.92	4.69	5.88	.016*
Instructional feedback	4.72	4.54	3.13	.078
Facilitating instruction	4.64	4.54	.60	.439
Communication within the educational environment	5.14	4.90	6.06	.014*
Performing non-instructional duties	5.06	4.71	11.69	.001*

Note. Means were calculated using a scale where: 1 = Unsatisfactory; 2 = Below Standard; 3 = At Standard; 4 = Above Standard; 5 = Well Above Standard; and 6 = Superior.

$^a n = 176$.

$^b n = 176$.

$^* p < .05$.

As reported in Table 2, the teachers rated their performance in conducting the activities composing the major function "management of student behavior" significantly higher ($p < .05$) than their principals. However, the combined mean score for both the teachers and principals in assessing the performance of the vocational education teachers for this instructional function was 4.70 on the six point scale which indicated that, overall, both the teachers and principals felt that the teachers performance regarding this instructional function was "above standard." The teachers also rated their performance slightly higher than did the principals for the instructional practice regarding the governing of student verbal participation and talk during different types of instructional activities. However, the difference was not significantly different ($p > .05$).

Table 2 also reports that the mean self-assessment of the teachers regarding their performance in monitoring the behavior of all students during whole-class, small group, and seat work activities and during transitions between instructional activities was 5.02. This indicated the highest self-assessment given by the teachers for any of the instructional practices evaluated regarding the management of student behavior. The teachers mean self- assessment score for this instructional practice was significantly higher ($p < .05$) than the evaluation given by the principals for the practice.

Table 2
Vocational Education Teacher Performance in Managing of Student Behavior as Determined by Teacher Self-Assessments and Principal Evaluations

Instructional practices for Managing student behavior	Teacher Self-assessments M^a	Principal Evaluations M^b	F	p
Teacher has established a set of rules and procedures that govern the handling of routine administrative matters.	4.90	4.63	6.96	.009*
Teacher has established a set of rules and procedures that govern student verbal participation and talk during different types of activities such as whole-class instruction, small group instruction, etc.	4.60	4.53	.31	.579
Teacher has established a set of rules and procedures that govern student movement in the classroom during different types of instructional activities.	4.78	4.57	4.11	.043*
Teacher frequently monitors the behavior of all students during whole-class, small group, and seat work activities and during transitions between instructional activities.	5.02	4.60	16.91	.000*
Teacher stops inappropriate behavior promptly and consistently, yet, maintains the dignity of the student.	4.93	4.52	13.57	.000*

Note. Means were calculated using a scale where: 1 = Unsatisfactory; 2 = Below Standard; 3 = At Standard; 4 = Above Standard; 5 = Well Above Standard; and 6 = Superior.
$^a n = 176$.
$^b n = 176$.
$^* p < .05$.

Also, as reported in Table 2, the teachers' self-assessments of their performance in stopping inappropriate behavior promptly and consistently was significantly higher, ($p < .05$) than the assessment of their performance provided by their principals. However, over half, 53.4%, of the principals rated the performance of their teachers as either "well above standard" or "superior" for this instructional practice. The combined mean score for both the vocational education teachers and the principals in the research sample was 4.80 on the six point scale regarding the performance of the teachers in providing instructional monitoring of student performance. This indicated, that in general, both the teachers and their principals felt the performance of the teachers regarding this major instructional function was deemed to be frequently high and that some teaching experiences were demonstrated at a high level while others were at a consistently adequate/acceptable level.

As reported in Table 3, the self-assessments of the teachers, regarding their performance, were significantly higher ($p < .05$) than their principals for the instructional practices, "teacher circulates during class work to check all student's performance," and "teacher routinely uses oral, written, and other work products to check student progress." The means scores reported indicated that as a group, the teachers rated their performance for both instructional practices as "well above standard" while the principals rated their performance as "above standard."

Table 3

Vocational Education Teacher Performance in Providing Instructional Monitoring of Student Performance as Determined by Teacher Self-Assessments and Principal Evaluations

Practices for instructional Monitoring of student performance	Teacher Self-assessments M^a	Principal Evaluations M^b	F	p
Teacher maintains clear, firm, and reasonable work standards and due dates.	4.82	4.72	.96	.328
Teacher circulates during class work to check all students' performance.	5.11	4.71	15.76	.000*
Teacher routinely uses oral, written, and other work products to check student progress.	5.01	4.69	9.35	.002*
Teacher poses questions clearly and one at a time.	4.74	4.64	.96	.327

Note. Means were calculated using a scale where: 1 = Unsatisfactory; 2 = Below Standard; 3 = At Standard; 4 = Above Standard; 5 = Well Above Standard; and 6 = Superior.
$^a n = 176$.
$^b n = 176$.
$^* p < .05$.

As reported in Table 4, the self-assessments by the teachers were significantly higher ($p < .05$) than the assessments made by the principals regarding the teachers' performance in treating all students in a fair and equitable manner. This difference was caused primarily because 47.2% (n=83) of the teachers evaluated their performance as "superior" for the instructional practice while only 33% of

Table 4

Vocational Education Teacher Performance in Communicating Within the Educational Environment as Determined by Teacher Self-Assessments and Principal Evaluations

Practices for communicating within The educational environment	Teacher Self-assessments M^a	Principal Evaluations M^b	F	p
Teacher treats all students in a fair and equitable manner.	5.18	4.88	8.50	.004*
Teacher interacts effectively with students, coworkers, parents, and community.	5.10	4.91	3.37	.067

Note. Means were calculated using a scale where: 1 = Unsatisfactory; 2 = Below Standard; 3 = At Standard; 4 = Above Standard; 5 = Well Above Standard; and 6 = Superior.
$^a n = 176$.
$^b n = 176$.
$^* p < .05$.

the principals assigned "superior" ratings for the practice. These ratings indicated that one-third of the principals and nearly half of the teachers perceived that the fair and equitable manner in which the vocational teachers treated their students was consistently outstanding.

As reported in Table 5, the teacher self-assessment scores were significantly higher ($p < .05$) than those of the principals for all three instructional practices listed under the major function "performing non-instructional duties." While the mean assessment scores of the principals regarding the teachers performance in conducting the three instructional practices, were in the "above standard" category, the teachers perceived their performance to be "well above standard" for all three practices.

Table 5
Vocational Education Teacher Performance in Performing Non-instructional Duties as Determined by Teacher Self-Assessments and Principal Evaluations

Practices for performing Non-instructional duties	Teacher Self-assessments M^a	Principal Evaluations M^b	F	p
Teacher carries out non-instructional duties as assigned and/or as need is perceived.	5.07	4.84	4.84	.028*
Teacher adheres to established laws, policies, rules, and regulations.	5.11	4.68	14.30	.000*
Teacher follows a plan for professional development and demonstrates evidence of growth.	5.01	4.69	12.50	.000*

Note. Means were calculated using a scale where: 1 = Unsatisfactory; 2 = Below Standard; 3 = At Standard; 4 = Above Standard; 5 = Well Above Standard; and 6 = Superior.
$^a n = 176$.
$^b n = 176$.
$*p < .05$.

CONCLUSIONS

The following conclusions were drawn based on the findings of this study:

1. Vocational teachers in the Central Region of North Carolina perceived that their teaching performance was from "above standard" to "well above standard" in the eight major instructional functions measured by the State adopted teacher performance appraisal system. This indicated that the vocational teachers felt that their performance within the major instructional functions tended to range from high to outstanding.

2. Principals in the Central Region of North Carolina generally perceived that the performance of their vocational education teachers was "above standard" in the eight major instructional functions measured by the State adopted teacher performance appraisal system. This indicated that the principals perceived some of the 38 teaching experiences incorporated within the assessment instrument were being demonstrated at a high level while the others were being demonstrated at a consistently adequate/ acceptable level.

3. The North Carolina adopted Teacher Performance Appraisal Instrument can be used as an adequate means for evaluating the teaching performance of vocational education teachers. While teaching techniques and student learning experiences in the learning environment of vocational education classes are often different than those typically found in the regular academic classroom, the mean assessments by the principals indicated that they felt the vocational education teachers were

performing at an "above standard" level in each of the major instructional functions evaluated with the instrument. Further, for major instructional functions in which the principal assessments were significantly different than those of the teacher self-assessments, the teaching practices composing those functions should apply equally as well for vocational education teachers as they do for regular academic teachers.

RECOMMENDATIONS

Based on the finding and conclusions of this study, the following recommendations are suggested:

1. Better communications need to be established between vocational education teachers and their principals. Teachers need to convey a clearer picture to the principals concerning the quality of their performance and instructional programs, while principals need to relate to the teachers in precise terms what is perceived as being "well above standard" and "superior" teaching performance for each of the eight major instructional functions measured by the State adopted teacher performance appraisal instrument.

2. If the Division of Vocational Education leadership feels that the State adopted instrument inadequately addresses the applications of hands-on or off-site teaching situations, they should develop an instrument to address those teaching practices and request that it be adopted by the State Department of Public Instruction as a supplemental instrument to be used when assessing the teaching performance of vocational education teachers.

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A STUDY OF THE PERCEPTIONS AND ATTITUDES OF TENNESSEE AGRICULTURAL EXTENSION SERVICE PERSONNEL TOWARD IN-SERVICE TRAINING

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INTRODUCTION

According to a 1982 report by the American Society for Training and Development, public and private employers in the United States spend more than 30 billion dollars annually on employee development (Shelton and Craig, 1983). For most people, the term "in-service training" implies taking a course away from the routine work place. A recent training commission survey (cited in Johnson, 1986) shows that nearly half of all employee training is delivered at the normal work place. Staff development and training are not one-and-the-same. Training refers to the process by which employees are taught the necessary skills to maintain an acceptable performance level. Development assumes that these necessary skills are present (Johnson, 1986).

On-the-job training may be formally scheduled with lectures, demonstrations, simulations, and practice or may be informal and controlled by first line supervisors. This type of work place in-service training is learned faster, retained longer and results in greater productivity gains than skills learned in the classroom (Wehrenberg, 1987).

Classroom training is important for introductory sessions (Roth, 1989) but employees must depend on constantly updating their skills and knowledge to remain effective in their jobs. One of the strongest trends in executive training today is the increasing use of advanced technologies such as laser videodisc. An increasing number of executives are turning to consultants and attending seminars (Romei,1986).

In Tennessee, the Agricultural Extension Service views in-service training as a process of further developing skills learned in school. Tennessee Agricultural Extension Agents, in the past, have traditionally selected and participated in at least seven (7) days of in-service training annually. In many cases, the subject matter chosen was based upon personal preference, not need. In other cases, subject matter was mandatory without regard to audience mix, need, or job responsibility.

When a new dean was selected to lead the Tennessee Agricultural Extension Service (TAES) in 1989, he became concerned about the content, delivery methods and practicality of the in-service training received by field staff. Staff development and in-service training, in particular, is a high priority in his new administration. As a result, a committee of 14 Extension professionals was appointed and given the charge of evaluating the present in-service training program and making recommendations regarding the need for improving what was offered. This paper describes the process employed and recommendations made by that committee.

PURPOSE AND OBJECTIVES

The purpose of the study was to evaluate the in-service training efforts within the Tennessee Agricultural Extension Service as perceived by Extension service personnel. Findings were used to make recommendations to Extension administration regarding the future of the in-service and staff development programs.

PROCEDURES

This was a simple descriptive study. A questionnaire comprised of one attitudinal scale proposing to measure overall attitude toward in-service efforts and a series of other close-ended and open-ended items was developed and validated by a panel of Extension professionals selected from members of the original committee. After being reviewed by each committee member, it was pilot-tested using 20 Extension agents currently employed with TAES. Cronbach's Alpha Coefficient was calculated on the final data sample to determine the internal consistency of the attitudinal scale. The scale was considered acceptable based upon the calculated alpha of .79. Due to time constraints and the relatively high face validity and content validity of the instrument, a coefficient of stability was not calculated. Prior to mailing the questionnaire to the total sample, minor editorial revisions were made based upon responses from the pilot test.

Questionnaires were mailed to a 20 percent randomly selected sample of Extension personnel (n=100). The sample was drawn from a validated list of all professionals currently employed in TAES. Each name in the sampling frame was assigned an identification number and a computer was used to randomly generate a list of identification numbers which were selected to participate in the study. Within two weeks of mailing the questionnaires, 97 (97 percent) had been returned. This was considered an adequate response rate and no effort was made to follow-up the three persons not responding.

ANALYSIS OF DATA

Data from 97 Extension personnel were collected and analyzed using SPSS_x (Release 3.0) mainframe computer software available at the University of Tennessee Computer Center. Cronbach's Alpha Coefficient was calculated for the attitudinal scale. Means, standard deviations, and frequencies were computed to analyze the data.

RESULTS

Sixty percent of the respondents were male and 40 percent were female. Twenty percent had been employed less than five years, 38 percent had been employed between five and 15 years, and the remaining 42 percent had been employed with TAES longer than 15 years. The average age of respondents was between 41 and 50. Forty percent of those responding held bachelors' degrees, while 41 percent of them held Masters' degrees. Three percent had completed some work beyond the Master's level and 16 percent held Doctoral degrees. Following is an "abbreviated" summary of the findings from the study which have implications for recommendations made to TAES administration.

OVERALL SATISFACTION WITH IN-SERVICE

Agents were ask to respond to a series of seven Likert-type attitudinal statements relating to in-service education for employees in TAES. Responses for each item could range from 1 (strongly disagree) to 5 (strongly agree). After determining that the items did indeed represent an acceptable attitudinal scale (alpha = .79), responses to these items were summed and used collectively, as an indication of overall satisfaction with the in-service offerings available. Scores could therefore range from 7 (very dissatisfied) to 35 (very satisfied). The mean satisfaction score for all persons in the survey was 25.3, indicating that although agents were generally satisfied with what was being offered, there was need for improvement.

METHODS OF IN-SERVICE DELIVERY

Fifty-one percent of the respondents indicated they would like to see the commonly used delivery methods changed. Comments from these respondents indicated they were dissatisfied with what they perceived as poor presentation skills, and subject matter which was uninteresting and not useful. Twenty four percent of the respondents were satisfied with current delivery methods and the remaining 25 percent had no opinion.

THE USE OF "REFERENCE MANUALS"

Information retrieval is often a serious problem after receiving training. Greater than 88 percent of respondents believed that TAES specialists responsible for in-service training should develop more reference manuals which would make the materials more accessible to agents after the in-service was over.

AUDIENCE MIX

In-service training is presently given to all Extension professionals at the same time regardless of the number of years of experience they have. Slightly less than 60 percent of the respondents believed that younger, less experienced agents should not attend the same training as more experienced agents. They preferred materials to be developed and presented to more homogeneous groups, thus allowing the difficulty level of the material covered to be different for each group of professionals.

USE OF "OUTSIDE PROFESSIONALS" AS TRAINERS

Greater than 90 percent of respondents indicated they could benefit from training delivered from professionals, other than the traditional Extension state specialist staff members who normally develop and deliver in-service for TAES.

CONCLUSIONS AND/OR RECOMMENDATIONS

Based upon this study the staff development committee made eight recommendations for strengthening the staff development and training process.

1. A basic curriculum should be developed for staff training. Response to the survey indicated the majority of the staff would support a core curriculum. A core curriculum would improve staff attitudes toward in-

service training (80%),[1] improve subject matter knowledge (89%) and increase their support for training (78%).

The Committee proposes a basic curriculum with three levels.

Level I would have three core areas: Extension Education Core, Subject Matter Core and Leadership and Development Core. These cores would provide training in basic skills and knowledge that all professionals selecting Extension as a career would need to be successful.

Level II of the basic curriculum would include advanced training in each core area. Participation in Level II would be determined by the county and/or agent's needs.

Level III training would consist of updates and special impacts delivered to all professionals on an as-needed basis.

2. Reference manuals for each subject matter area should be developed and made available for each staff member responsible for programming in the area. Over 88 percent of the survey respondents expressed a need for readily accessible reference manuals. The reference manuals would include responses to frequently asked questions and basic information pertinent to each subject matter. The reference manuals would be used as training tools for all segments of the core curriculum.

3. Teaching techniques for in-service training should include more hands on experience, use of electronic technology and field trips. Survey respondents indicated a need for change in the delivery methods for in-service training. Hands on experience (89%), use of electronic technology (68%) and more use of field trips (79%) were three methods identified as a means of strengthening training.

   Specialists and county staffs need training in "how to teach" and how to use the latest technology. A state program is needed to provide all staff with "new" equipment and supplies to present programs with the best delivery system (e.g. purchasing VCR's, etc).

4. The audience mix for in-service training should be based on experience. An audience mix based upon years of experience would encourage questions/interchange among younger professionals and prevent boredom/distractions by those who already have covered the basics.

5. Use of testing as a measurement of successful completion of in-service should be carefully evaluated. The agents attitude toward testing, as a measure of success, was negative unless tied to incentives. Agents tended to favor testing for determining in-service needs, curriculum entry level and to measure advancement in the curriculum.

   Possible alternatives to testing are the use of standardized evaluation forms or contracts with the in-service participants.

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[1] Numbers in parentheses indicate the percent of respondents responding affirmatively to the statement in question.

Standardized evaluation forms could be used at all training sessions. Participants would evaluate teaching techniques, subject matter content, and projected practice change.

Contracts with participants could specify commitments regarding how agents would use the information in their programs. Copies of the contracts would be in the files of the agents, the associate supervisors and specialists delivering the in-service training. If testing is used, options for incentives are promotion, certification by subject (Extension Education Units), MBO scores, awards and recognition, and dollars.

6. Staff from outside the Agricultural Extension service should be used for some in-service training. The Agricultural Extension Service could strengthen in-service training by occasionally using the expertise of outside professionals.

7. The 1990 Annual conference should be used as a "kick off" for the new approach to in-service training. In-service training at annual conference should be general in nature and meet the needs of staff members without regard to areas of responsibility. Select professionals such as CareerTrack personnel outside the Agricultural Extension Service to present programs about motivation, leadership, public relations, office management, interpersonal relationships, supervision, use of volunteers, etc.

8. At the end of 5 years (1996) resurvey the Extension staff concerning in-service training.

The purpose of this study was to gather information and make recommendations to strengthen the in-service training program for the University of Tennessee Agricultural Extension Service. The majority of Extension professionals supported the notion that commonly used delivery methods needed improvement. Reference manuals need to be developed and/or revised such that they are readily available to all professionals. They should be written on a level of understanding appropriate for young inexperienced agents. In-service offerings should be developed separately for both younger and more experienced professionals. Finally, consideration should be given to using less traditional subject matter experts as well as traditional state Extension specialists when delivering some in-service programs.

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ACADEMIC DIMENSIONS OF SUCCESS IN A COLLEGE OF AGRICULTURE

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The ability to accurately predict a student's success in college has long been a goal of educators. Historically, high school grade point average, standardized test scores (SAT/ACT), and class rank have been used to predict college grade point average through utilization of multiple regression (Merante, 1983). Studies have found that high school academic record (GPA and/or class rank) is the best predictor of college academic achievement (Task Force on Undergraduate Admissions: Final Report, 1977; Trusheim & Crouse, 1984). However, these measured variables, such as class rank and ACT scores, explain only 40-50% of the variance in college GPA.

Currently, standardized test scores and high school grades are a substantial part of many colleges and universities' admission policies (Arnstine, 1983). In addition to these criteria, a number of universities and colleges have implemented (or increased) college preparatory curriculum requirements resulting in increased selectivity of new students to these schools (McCurdy, 1982). This increased emphasis of a prescribed college preparatory curriculum reflects the movement of higher education from quantity to quality education (Newman & Warmbrod, 1986; Wilder & Somers, 1983). The Ohio State University was one of the institutions that implemented a selective admissions policy which includes a prescribed college preparatory curriculum.

There were no admission requirements prior to 1984 for students entering The Ohio State University. Beginning in the autumn quarter of 1984, entering new first-quarter freshmen needed to complete a prescribed college preparatory curriculum in high school in order to be granted "unconditional" admission status. If a student does not complete the prescribed curriculum they are admitted "conditionally" and are required to take college courses that correct the deficiency. These courses do not count towards graduation. The Ohio State University implemented true selective admissions in the autumn of 1987 when the university started using students' class rank and ACT scores as criteria for admission. The College of Agriculture initiated a longitudinal study in order to determine the impact of these policies on students that enroll in the college.

PURPOSE AND OBJECTIVES

There has been little attempt to identify the underlying dimensions of academic success in colleges of agriculture. The studies conducted have focused on college grade point average as the sole indicator of success. However, success in college is much more complex than a four-point grade average. Success in college is an unobservable construct that is probably influenced by other unobservable variables as well as measured variables. As competition continues to escalate for admission into highly regarded schools the need for educators to understand the underlying constructs of academic success in college has become increasingly important. The purpose of this study was to identify the academic dimensions of success in the College of Agriculture at The Ohio State University. The following research objectives were used to guide the study:

1. To determine the underlying academic factors of success in the College of Agriculture.

2. To determine the relationship between the academic factors of success in the College of Agriculture.

PROCEDURES

The study was descriptive and correlational. The population was 501 students who began study as new first-quarter freshmen in the College of Agriculture at The Ohio State University in the autumn quarters of 1981, 1982, and 1983. Data regarding the students' rank in high school graduating class, ACT composite score and high school courses (units of: vocational agriculture, science, math, English, social science, art, and foreign language) completed were obtained from transcripts and other official documents. Data regarding total credit hours, number of quarters completed and final college grade point average were obtained from university transcripts.

DATA ANALYSIS

Exploratory factor analysis was used to uncover and describe the academic factors underlying success in the College of Agriculture. Exploratory factor analysis was chosen as there has been little systematic investigation of the interrelations among courses, grades, and standardized tests. Consequently, a model of the academic dimensions of success in a college of agriculture does not exist. Rummel (1970) asserted that exploratory factor analysis is useful for exploring the unknown. Rummel (1970) further suggested that factor analysis enables the social scientist to untangle interrelationships and to separate different sources of variation.

RESULTS

Common factor analysis was used to describe the sample based on the 12 measured variables included in the analysis. These variables were final college G.P.A., total number of college credits, total number of quarters spent in college, units of high school English, math, science, social science, foreign language, art, vocational agriculture, high school class rank, and ACT Composite score. Descriptive statistics and correlations among the 12 measured variables are reported in Table 1. Principal axis, with squared multiple correlations (SMC) being used to estimate the communalities, was the factor extraction method employed in this study. The first principal axis extraction was conducted with zero factors retained in order to obtain eigenvalues for a scree plot (Table 2). Examination of the scree plot indicated there was a sharp drop after the third

Table 1. Means, Standard Deviations, and Reduced Correlation Matrix with Estimated Communalities (SMC) on the Diagonal

Variable	X	SD	1	2	3	4	5	6	7	8	9	10	11	12
1 COLGPA	2.48	.70	.625											
2 CREDITS	158.0	68.41	.614	.909										
3 QUARTER	10.37	4.18	.455	.926	.884									
4 ENGLISH	3.62	.66	.050	.067	.080	.059								
5 MATH	3.13	1.03	.419	.298	.218	.131	.425							
6 SOCSCI	2.80	.79	.014	.025	.061	.085	.048	.089						
7 NAT SCI	2.59	.99	.310	.189	.148	.199	.453	-.012	.348					
8 FORLANG	1.18	1.20	.115	-.016	-.022	.111	.250	.103	.309	.286				
9 ART	1.19	1.38	.024	-.027	-.005	.008	-.007	-.161	-.001	.051	.115			
10 VOC AG	2.09	2.44	-.022	.015	-.025	-.146	-.183	-.153	-.353	-.466	-.184	.380		
11 RANK	72.51	21.74	.598	.329	.198	.050	.448	-.029	.277	.095	.095	.111	.488	
12 ACT	20.84	5.27	.520	.263	.170	.059	.554	.041	.382	.270	.041	-.096	.525	.468

factor. Consequently, three factors were retained for the remainder of the analysis.

Table 2. Eigenvalues of the Reduced Correlation Matrix

	Factors											
	1	2	3	4	5	6	7	8	9	10	11	12
Eigenvalue	3.125	1.429	.843	.292	.118	.0287	.009	-.069	-.101	-.129	-.168	-.301
Difference	1.696	.586	.550	.174	.090	.020	.078	.032	.027	.039	.133	
Proportion	.616	.281	.166	.058	.023	.006	.002	-.014	-.020	-.025	-.033	-.059
Cumulative	.616	.897	1.063	1.121	1.144	1.149	1.151	1.138	1.118	1.092	1.059	1.00

A second principal axis extraction was conducted with three factors retained. The resulting unrotated factor loading matrix is reported in Table 3. A promax solution was conducted on the resulting unrotated factor loading matrix to increase the interpretability of the factors. The rotated factor pattern matrix is reported in Table 4, the rotated factor structure matrix is found in Table 5, and Table 6 provides the factor correlation matrix. A descriptive approach (Rummel, 1970) was used in the interpretation of the factors. To assist in the interpretation and designation of each factor, only measured variables with absolute values of .4 or higher were considered as high loadings.

Table 3. Unrotated Factor Loading Matrix

	Factors		
Variable	1	2	3
College GPA	.76750	-.04984	.21537
Total Credits	.78379	-.53863	-.19295
No. Quarters	.67724	-.56614	-.34725
Units English	.14424	.13311	-.16041
Units Math	.60971	.30950	.08641
Units SocScience	.05251	.06286	-.17743
Units Science	.47806	.38754	-.12411
Units For Lang.	.24126	.47553	-.26437
Units Art	.03551	.10255	-.02260
Units Voc Ag	-.16138	-.45200	.50038
Class Rank	.60573	.10521	.42586
ACT Composite	.62154	.30941	.23745

Table 4. Rotated Factor Pattern Matrix of Loading Order of Twelve Academic Measures on Oblique Factors

Variable	Oblique Rotation of Factors 1	2	3
Class Rank	(.78756)	-.04070	.19107
ACT Composite	(.73185)	-.07496	-.09005
College GPA	(.65309)	.28630	.07820
Units Math	(.60050)	.01103	-.21472
No. Quarters	-.05972	(.98036)	-.07371
Total Credits	.11774	(.91797)	.02117
Units Voc Ag	.10952	-.03728	(.71384)
Units For Lang	.14583	-.08494	(-.54351)
Units Nat Sci	.37637	.01422	(-.41468)
Units English	.01984	.06670	-.23778
Units Soc Sci	-.08405	.08566	-.19487
Units Art	.04891	-.04742	-.08552

Table 5. Rotated Factor Structure Matrix of Twelve Academic Measures on Oblique Factors

Variable	Factors 1	2	3
College GPA	.57737	.26098	.07523
Total Credits	.10409	.83681	.02037
No. Quarters	-.07932	.89368	-.07091
Units English	.01754	.06080	-.22876
Units Math	.53088	.01005	-.22876
Units Soc Sci	-.07430	.07809	-.18748
Units Nat Sci	.33273	.01296	-.39895
Units For Lang	.12893	-.07743	-.52290
Units Art	.04324	-.04322	-.08227
Units Voc Ag	.09682	-.03398	.68676
Class Rank	.69624	-.03710	.18383
ACT Composite	.64700	-.06834	-.08663

Table 6. Inter-Factor Correlations

	Academic Ranking	Academic Duration	Academic versus Vocational Prep
Academic Ranking	1.0		
Academic Duration	.3947	1.0	
Academic v. Voc.Prep	-.2444	.01496	1.0

CONCLUSIONS AND/OR RECOMMENDATIONS

The highest loadings for the first factor, Academic Ranking, were Class Rank, ACT Score, College GPA, and Units of High School Math past Basic Math. This factor was labeled Academic Ranking inasmuch the dominant loadings, except for units of math, indicated a measure of academic performance in relation to other students. The high loading for Units of Math past Basic Math probably resulted because higher ranking students likely tend to take more units of math past basic math. This factor accounted for 61.6% of the variance in the variables included in the analysis.

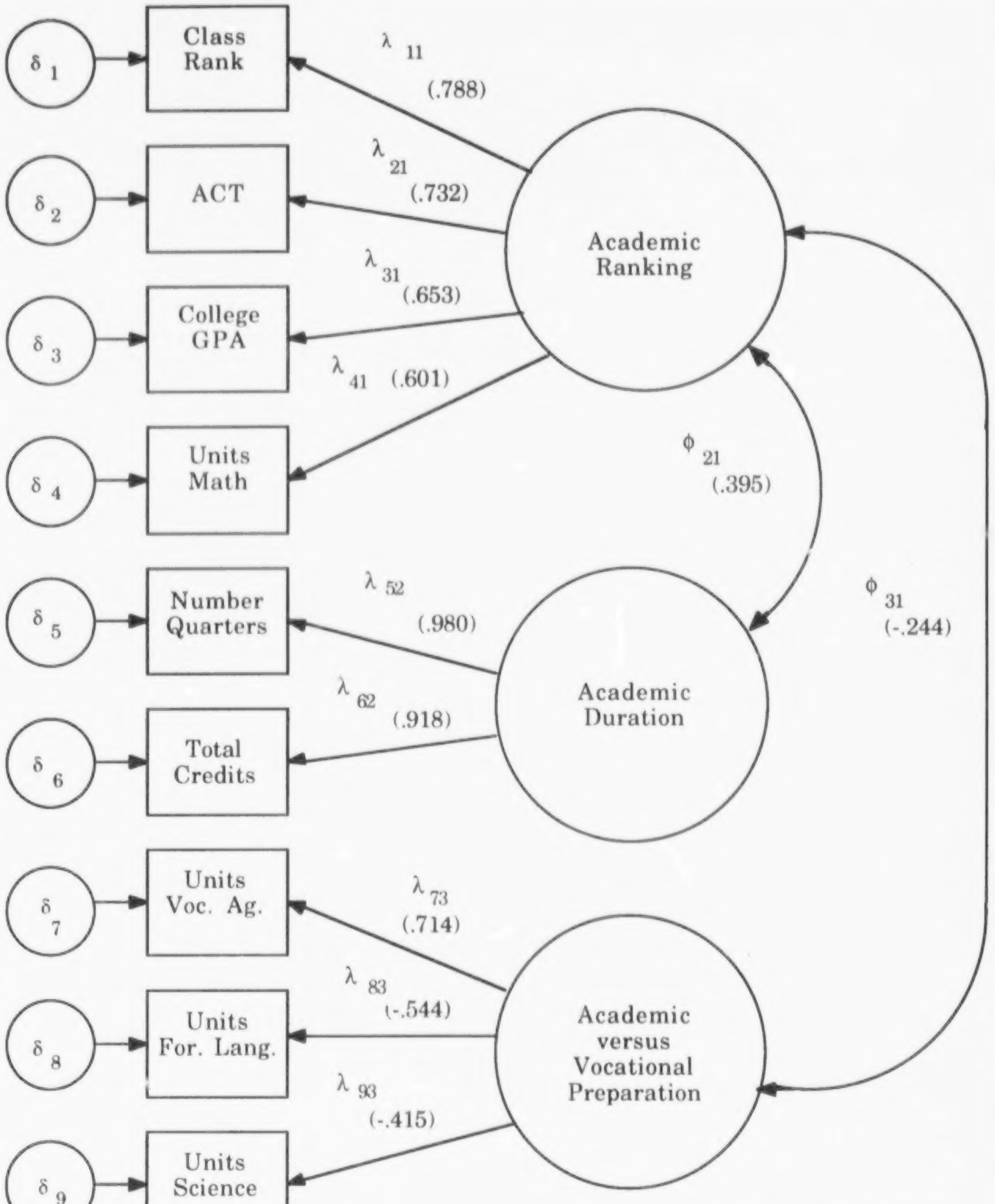
The second factor was characterized by high positive loadings on Total College Credits and Number of College Quarters Completed. This factor was labeled Academic Duration, indicating that length of time spent in school was an underlying dimension of success in a college of agriculture as both Total College Credits and Number of Quarters Completed were measures of duration spent in coursework. The eigenvalue for Academic Duration indicated that this factor accounted for 28.1% of the variance in the included variables.

The third factor, Academic versus Vocational Preparation, had a high positive loading for Units of Vocational Agriculture and high negative loadings for units of Foreign Language and Science. This dimension indicated that students high on vocational preparation for agriculture tended to be low on academic preparation for college. Students were most likely taking vocational agriculture in lieu of science and foreign language and vice versa. Seventeen percent of the variance in the variables in the factor analysis was accounted for by the Academic versus Vocational Preparation factor.

Examination of inter-factor correlations showed that Academic Ranking had a positive moderate correlation (r=.395) with Academic Duration indicating the more time spent academically the better the ranking of the student (Table 6). There was also a low positive relationship (r=.244) between Academic Ranking and Academic versus Vocational Preparation indicating the more vocational preparation the student had the lower the ranking of the student. Academic versus Vocational Preparation appeared to be orthogonal to Academic Duration as there was a negligible correlation (r=.01) between the two factors. This finding indicated that the amount of time a student spent in college was not related to the types of courses taken in high school.

Three measured variables, English, Social Studies, and Art, did not have any high loadings on the three factors. This was probably due to the lack of variation and covariation among the variables. These humanity courses are required by most high schools for graduation and, consequently, the amount of courses taken in these areas by students tends to be constant.

Based on the results of the exploratory factor analysis a path diagram depicting the academic dimensions of success in a college of agriculture is proposed (Figure 1). The proposed path diagram has three latent variables influencing


δ 1
δ 2
δ 3
δ 4
δ 5
δ 6
δ 7
δ 8
δ 9
Class Rank
ACT
College GPA
Units Math
Number Quarters
Total Credits
Units Voc. Ag.
Units For. Lang.
Units Science
λ 11 (.788)
λ 21 (.732)
λ 31 (.653)
λ 41 (.601)
λ 52 (.980)
λ 62 (.918)
λ 73 (.714)
λ 83 (-.544)
λ 93 (-.415)
Academic Ranking
Academic Duration
Academic versus Vocational Preparation
ϕ 21 (.395)
ϕ 31 (-.244)

NOTE: Values in parentheses represent results from the exploratory factor analysis used in the development of this model.

Figure 1. Proposed Path Diagram of Academic Dimensions of College Success

nine measured variables. There are nine unique factors also influencing the nine measured variables. The factors Academic Duration and Vocational versus Academic Preparation appear to be oblique in relation to Academic Ranking while Academic Duration and Vocational versus Academic Preparation appear to be orthogonal to each other based on the results of the exploratory factor analysis. It is recommended that this proposed model be evaluated by means of confirmatory factor analysis utilizing a new set of data. This new data should come from students who were admitted to the College of Agriculture after implementation of the admissions policy so that the dimensions of academic success for students admitted prior to the admissions policy can be compared to those of students admitted after implementation of selective admissions.

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Appendix

A Complete Listing of the Paper Proposals Submitted for Consideration for the 1990 National Agricultural Education Research Meeting, Cincinnati.

A Complete Listing of the Paper Proposals Submitted for Consideration for the 1990 National Agricultural Education Research Meeting.
Cincinnati, Ohio

A Study of the Training Needs of Vocational Teachers with Mainstreamed Special Education Students
Wayne E. Asche and Lewis P. Burrell, Kent State University

An Exploration of Differences Between Agricultural Education Graduates Who Entered the Teaching Profession and Graduates Who Entered Occupations Other than Teaching
Matt Baker and Lowell Hedges, The Ohio State University

The Impact of Summative Evaluations by Cooperating Teachers Upon Final Student Teaching Grades
Matt Baker and Lowell Hedges, The Ohio State University

The Impact of Selected Community Agricultural Characteristics Upon Secondary Agricultural Education Program Quality in Rural School Districts
Matt Baker and J. David McCracken, The Ohio State University

Time Utilization of Vocational Supervisors
R. Kirby Barrick, The Ohio State University

A Recruitment Stategy for the College of Agriculture at the University of Idaho
Marc G. Beitia, Laurie L. Lancaster and Lou E. Riesenberg, University of Idaho

An Assessment of Agricultural Literacy
Curt Bertelsen, University of Arizona

National Study of Adult Education Programs in Agriculture Survey of State Supervisors and Teacher Educators
Robert J. Birkenholz and Gary L. Maricle, University of Missouri

Effect of Degree Program on Pedagogical Training Needs of Graduate Teaching Assistants
Tommy Bonner and Jacquelyn P. Deeds, Mississippi State University

Herzberg's Motivator-Hygiene Theory and the Job Satisfaction of Agricultural Education Faculty
Blannie E. Bowen and Rama B. Radhakrishna, The Pennsylvania State University

Impact of Personal Life Factors on Effectiveness and Statisfaction of Teachers
Thomas H. Bruening and Tracy S. Hoover, The Pennsylvania State University

The Effects of Maintenance on Environmental Noise Produced by the Planner
Stanley R. Burke, Virginia Tech

Practicing Agricultural Education Teachers' Concerns and Their Implications for Improving the Profession
Stanley R. Burke, Virginia Tech

A Comparison of the Leadership Attributes of High School 4-H Club Members and Non-Club Members
Michael F. Burnett and Kenneth J. Guidry, Louisiana State University

Job Satisfaction of Teachers of Agriculture
Jamie Cano, The Ohio State University

Factors Which Influence Participation and Non-Participation of Ethnic Minority Youth in Ohio 4-H
Jamie Cano and Joanne Bankston, The Ohio State University

Adult Education in Agriculture in the Southern Region of the United States: A Delphi Technique
Mohammed Chizari and Walter N. Taylor, Mississippi State University

The FFA Chapter Activity Index: A Model for Measuring the Activity Level of an FFA Chapter
Oren L. Christmas, The Ohio State University

Motivational Factors Influencing Students to Enroll in Joint Vocational School Programs
Oren L. Christmas and Wesley E. Budke, The Ohio State University

Stress and Turnover Among Extension Directors and Administrators
Richard W. Clark, Emmalou Van Tilburg Norland, and Keith L. Smith, The Ohio State University

Historical Study of Turnover Among Cooperative Extension System Directors and Administrators
Richard W. Clark, Emmalou Van Tilburg Norland, and Keith L. Smith, The Ohio State University

An Identification and Assessment of Educational Delivery Systems for Training of Private Pesticide Applicators
John L. Creswell, Iowa State University

Factors Influencing Secondary Michigan Agricultural Students' Decisions Not to Join the FFA
James Connors, Eddie Moore, and Jack Elliot, Michigan State University

Agricultural Concurrent Enrollment in Utah
Guy Denton, Makerere University,
Keith L. Smith, The Ohio State University, and
Weldon Sleight, Utah State University

Beginning Vocational Education Teacher Perceptions of Their Pedagogical Knowledge and Their Performance on the Professional Knowledge Portion of the National Teacher Exam
David L. Doerfert, Texas Tech University and
R. Kirby Barrick, The Ohio State University

Student/Teacher Participatory Interaction, Motivation, and Satisfaction During Group Problem Solving
Thomas J. Dormody, New Mexico State University and
H. Dean Sutphin, Cornell University

Transactional Preferences of Students and Teachers During Group Problem-Solving
Thomas J. Dormody, New Mexico State University

An Analysis of Selected Management Skills and Behaviors Perceived to be Learned and Used by Cooperative Extension Service Professionals in Iowa
Sharon Drake, Iowa State University

School and Community Decision-Makers' Perceptions About Future Secondary Vocational Education Programs in Agriculture
Jack Elliot, Michagan State University

Microcomputing Educational Needs of International Students
Mark Ellis and Kerry S. Odell, West Virginia University

A Model to Prepare Collaborative Consultants for International Youth Development
Arlen Etling, The Pennsylvania State University and
Janbaz Khan, NWEP Agricultural University

Instructional Content of Secondary Agricultural Programs in Missouri
K. Eugene Eulinger, Jr. and Bob R. Stewart, University of Missouri-Columbia

A Nursery/Landscape Program in Agricultural Education for the New Millennium: A Future Study Utilizing The Delphi Technique
Frank B. Flanders and Maynard J. Iverson, The University of Georgia

The Subject Areas and Concepts of Agricultural Literacy
Martin J. Frick, Purdue University
Alan A. Kahler and W. Wade Miller, Iowa State University

Assessing Inservice Needs of Agricultural Teachers
Julia A. Gamon and Randy Bowman, Iowa State University

Future Farmers of America - A Profile of Chapters and Advisors
Howard R. D. Gordon, Florida Community College

Factors Related to the Participation of Agricultural Education Teachers in Professional Development Activities
David E. Hall and Dennis C. Scanlon, The Pennsylvania State University

The Use of School Land Labortories Among Agriculture Teachers in West Malaysia
Ramlah Hamzah, Universiti Pertanian Maylysia and Edward W. Osborne, University of Illinios

Teachers' Knowledge and Attitudes Toward Problem-Solving Teaching
Ramlah Hamzah Universiti Peranian Malaysia and Edward W. Osborne, University of Illinios

Kansas Superintendent and Teacher Perceptions of Adult Education Programs in Agriculture
Steven R. Harbstreit, Kansas State University

Correlates of Accidents in Ohio Vocational Agriculture Mechanics Laboratories
David L. Hard, West Virginia University and
Larry E. Miller, The Ohio State University

Morale Levels of First-Year Agricultural Education Teachers in Ohio
Janet L. Henderson, The Ohio State University and
Ruben D. Nieto, Centro Commercial Cuatricentenario

Effects of Spousal Satisfaction on Job Satisfaction of Extension Agents
Michael Herbert, Louisiana State University

Effects of Georgia's Quality Basic Education Act on Secondary Programs of Agricultural Education
Ray V. Herren, The University of Georgia

The Commitment of Pennsylvania Vocational Educators to Advising Student Organizations
Tracy S. Hoover and Thomas H. Bruening, The Pennsylvania State University

Analysis of Two Teaching Methods Used in an Extension Home Vegetable Gardening Program
Holly V. Houghton, Larry R. Arrington, and Joan P. Bradshaw, University of Florida

Attitudes of School Administrators Toward Recommendations for Vocational Agricultural Education Program Reforms Developed by The National Research Council
Larry R. Jewell and Larry E. Price, North Carolina State University

Relationships Between Teaching Performance and the Selected Variables of Teaching Longetivity and Performance on Required Teacher Certification Examinations
Larry R. Jewell, North Carolina State University

Effectiveness of Teaching Performance: Differences in the Preceptions of Vocational Education Teachers and Their Principals
Larry R. Jewell, North Carolina State University

The Importance of Computer Skills for Entry Level Employment in North Carolina Perceived by Horticulture Professionals and Agriculture Teachers
Barbara Malpiedi Kirby and Evelyn McAdams Browning, North Carolina State University

Vocational Administrative Applications of Computer Technology in the Southern Region of the United States
Barbara M. Kirby and Larry R. Jewell, North Carolina State University, and Donald R. Herring, Montgomery County Schools

Attitudes, Knowledge, and Implementation of Agricultural Science by North Carolina Agricultural Education Teachers
Barbara M. Kirby, North Carolina State University

Career Indecision of Senior Vocational Agriculture Students
Joe W. Kotrlik, Louisiana State University

Expectations of Cooperating Teachers Regarding Student Teaching Programs in Agriculture: A National Study
Alvin Larke and Gary E. Briers, Texas A&M University, and Richard J. Norris, Southern Arkansas University

Factors Influencing Cooperation Between County Extension Agents and Secondary Agriculture Teachers in West Virginia
Stacy A. Gartin, Kerry S. Odell, and Layle D. Lawrence, West Virginia University

Effectiveness of Training Stategies on the Positive Transfer of Training in Extension
Denise L. Legvold and Richard I. Carter, Iowa State University

Leadership Ability of Young Urban Adults in North Dakota
Shane W. Lester, North Dakota State University and
Vernon D. Luft, University of Nevada-Reno

The Effectiveness of the Beginning Scholars Program in Attracting High Ability Students to the College of Agriculture and Home Economics
Melissa Lockard Lester and Donna Graham, University of Arkansas

A National Delphi Study on the Perceptions and Suggestions Directly Related to Developing a Vision for Agricultural Mechanics in the Secondary Agricultural Education Program
Richard E. Linhardt and Gary L. Maricle, University of Missouri

Student Perceptions of Characteristics and Activities Contributing to the Effectiveness of Vocational Agriculture Teachers
Vernon D. Luft, University of Nevada-Reno and
Gregory W. Thompson, Williston High School

Attitudes and Perceptions of School Administrators and Agricultural Advisory Committee Chairpersons Toward Agricultural Education Programs in California
Bonnie K. Magill and James G. Leising, University of California

Analysis of Enrollment in Secondary Agricultural Science and Membership in the FFA in Texas
Tom Marshall, Don Herring, and Gary Briers, Texas A&M University

Motivation and Cognition: Do They Work Together to Affect Student Performance?
David L. Marrison, R. Kirby Barrik, and Charles Miller, The Ohio State University

Attitudes, Perceptions, and Guidance Practices of Illinois Guidance Directors Concerning Vocational Education in Secondary Schools
Janet K. Matulis, Kennedy Research, Inc., and
Edward W. Osborne, University of Illinois

A Study of the Perceptions and Attitudes of Tennessee Agricultural Extension Service Personnel Toward In-service Training
Jack McDaniel, University of Tennessee Agricultural Extension Service, Michael Menefee, Pembroke State University, and Randol G. Waters, University of Tennessee Institute of Agriculture

Student Cognitive Performance and Factors Associated with Cognitive Performance in College of Agriculture Courses
Charles Miller and L. H. Newcomb, The Ohio State University

Participant Motivation in Off-campus Agriculture Credit Programs at Iowa State University
Bruce E. Miller and Harold R. Crawford, Iowa State University

The Performance of Students Under Attenuated and Non-attenuated Noise Conditions While Operating the Portable Circular Saw
Glen M. Miller, The University of Arizona

Self-Perceived Orientation Training Needs of Extension Professionals in Iowa
Ismail E. Mohamed, Julia A. Gamon, and Larry D. Trede, Iowa State University

Attitudes of Small-Scale Fishermen in Pangandaran Subdistrict, West Java, Indonesia Toward Selected Governmental Programs, the Occupation of Fishing, and Risk
T.R. Sigit Mursidi, The Fisheries Education and Training Institute and James E. Christiansen, Texas A&M University

Reader Opinions of The Journal of Agricultural Education
Michael E. Newman, Mississippi State University

Understanding and Teaching the Adult Learner: An Assessment of Cooperative Extension Service Faculty's Knowledge, Attitudes, and Behavior Related to Adult Education
Emmalou Van Tilburg Norland, Brenda Seevers, and Keith L. Smith, The Ohio State University

Understanding Success in 4-H: Factors Related to Older 4-H Member Satisfaction with Participation
Emmalou Van Tilburg Norland and Melissa Beaver Bennett, The Ohio State University

Follow-up of Female Graduates of the College of Agriculture at Oklahoma State University: 1985-1989
Andrea Martha Paret, Oklahoma State University

Perceptions of State Supervisors Concerning Adult Education in Secondary Agriculture
Robin Pennington, Stacy A. Gartin, Layle D. Lawence, Kerry S. Odell, and Richard K. Zimmerman, West Virginia University

Management of Time: A Key to Managerial Performance
Rama B. Radhakrishna, Connie Baggett, and Edgar Yoder, The Pennsylvania State University

Academic Dimensions of Success in a College of Agriculture
Matt R. Raven and J. Robert Warmbrod, The Ohio State University

The Relationship Between Vocational Agriculture and a College Preparatory Curriculum in Regards to Academic Success in College
Matt R. Raven and J. Robert Warmbrod, The Ohio State University

International Programming Delivered by County 4-H Professionals
Kimberly K. Reaman and Arlen Etling, The Pennsylvania State University

A Profile of High School and Beyond Experiences of 1983 High School Graduates Described within the High School Curriculum Concentration of the Graduates
Lou E. Riesenberg and Laurie A. Stenberg, University of Idaho

Factors Affecting Farm Safety Practices of Farmers
Stephen R. Schafer and Joe W. Kotrlik, Louisiana State University

Methods Used to Teach Agriculture
Mankelklot Haile Selassie and L. H. Newcomb, The Ohio State University

Attitudes of Major Constituent Groups Toward New Directions in the Vocational Agricultural Program
Dennis J. Sheppard and Maynard J. Iverson, The University of Georgia

Life Satisfaction of Retired West Virginia Vocational Agriculture Teachers
John W. Soloninka, Kerry S. Odell, Layle D. Lawrence, and Stacy A. Gartin, West Virginia University

An Assessment of the Leadership Practices Used by Agricultural Education Department Executive Officers (DEOs)
David R. Spotanski and Richard I. Carter, Iowa State University

The Influence of the Concurrent Credit Program on Students' Perceptions of Agriculture and Enrollment in a College of Agriculture
Gary S. Straquadine, Utah State University

Current and Expected Roles in Supervising Agriculture Education Programs in Utah
Gary S. Straquadine, Utah State University

Factors Influencing the Use of Volunteers by Michigan Secondary Agricultural Education Teachers
Murari Suvedi and Jack Elliot, Michigan State University

Michigan Secondary Agricultural Teachers' Perceptions of the Roles of Volunteers in Agricultural Education Programs
Murari Suvedi and Jack Elliot, Michagin State University

Administrator and Vocational Educator Perceptions of Summer Vocational Agriculture Program Activities
Michael K. Swan and Richard L. Cole, Oregon State University

The First Year of an Agriculture Teacher: A Case Study of Three Beginning Teachers
B. Allen Talbert, Virginia Tech

Educational Needs of International Graduate Students in Agriculture and Education
Bob R. Stewart, Richard E. Linhardt, and Joseph J. Timko, University of Missouri

Secondary Agriculture Teachers' Estimates of Readability and Reading Grade of Eleventh Grade Agricultural Education Students
Lori Varner-Friddle, Stacy A. Gartin, Layle D. Lawrence, and Kerry S. Odell, West Virginia University

Teacher Attributes in Exemplary Vocational Education
George Wardlow, Jerome Migler, and Gordon Swanson, University of Minnesota

Perceptions of Importance of Critical Thinking in Vocational Agriculture Students in the United States
Connie M. Ware and Alan A. Kahler, Iowa State University

A Study of the Relationship of Participation in In-school 4-H and Self-Esteem for Students in the Las Vegas School System
Randol G. Waters, University of Tennessee Institute of Agriculture, Carla Fitzgerald, Larry Haskell, and George Hill, Nevada Cooperative Extension

Health Factors as Predictors of Agriculture Teacher Efficacy
Lyle E. Westrom, University of Minnesota, and Jasper S. Lee, Mississippi State University

Perceptions of Selected Educators of the Quality of Instruction in Secondary Vocational Agriculture Programs in Iowa
Hershel Weeks, Oregon State University, and
Alan K. Kahler, Iowa State University

Experimental Evaluation of an Environmental Conservation Technology Instructional Unit
Linda S. Whent and David L. Williams, Iowa State University

Roles of Agricultural Extension Workers in Nepal
David L. Williams, Iowa State University and
Narayan Kunwar, Tribhuvan University

Procedures and Practices Used in Successful Young Farmer Programs in the United States - Developing A Model for Providing Adult Education in Agriculture
Robert E. Wolf and Edward Osborne, University of Illinios

Economic Competencies Needed and Possessed by Farmers in Hyderabad District, Sind, Pakistan
M. Yameen Memon and Dr. David L. Williams, Iowa State University

The Use of Computer Software Programs in Specific Agriculture Topics
Mark Zidon and W. Wade Miller, Iowa State University

What Teachers Think About High School Students' Need to Use Computers in Agriculture Classes
Mark Zidon and W. Wade Miller, Iowa State University

Safety Practices and Equipment Used in Mississippi Agricultural Mechanics Laboratories
William E. Fletcher and Don M. Johnson, Mississippi State University

Computer Anxiety Level Among Secondary Agricultural Educators in the United States
William E. Fletcher and Jacquelyn P. Deeds, Mississippi State University

Student Achievement and Factors Related to Achievement in a State FFA Agricultural Mechanics Contest
Donald M. Johnson, Mississippi State University

Analysis of Contestants' Scores in a State FFA Agricultural Mechanics Contest
Donald M. Johnson, Mississippi State University

The Success of High School Vocational Education Completers as Compared to General Population University Students
William Love and Michael Rush, Idaho State Division of Vocational Education

Assistance Needed by Elementary Teachers in Texas to Implement Programs of Agricultural Literacy
H. Robert Terry, Jr., Don R. Herring, and Alvin Larke, Jr., Texas A&M University

The Relationship of Observable Teaching Effectiveness Behaviors to Teacher Temperament
Leverne A. Barrett, University of Nebraska-Lincoln

*Listed in order the papers were received by the 1990 NAERM Chairperson